WM # 861

DATE: December 17, 2002

TO: Division of Drinking Water Staff

THROUGH: Robert Taylor, P.E., Director
Division of Drinking Water

Gerald Peaks, P.E., Director of Technical Services
Division of Drinking Water

FROM: Steve Clark, Small Systems Coordinator
Division of Drinking Water

SUBJECT: Surveillance -Transient Noncommunity Waterworks
Procedures Manual

DELETE: Working Memo Nos. 854 and 858

In order to better assist the Division in the oversight of Transient Noncommunity (TNC) waterworks, a procedures manual has been developed and attached for DDW Staff use. All clarifications, changes, etc. to this Manual will be sent to the field offices following established working memo format. The latest manual will be posted on the OWP Share Drive under owpshare/Central/TNC/TNC Procedures Manual.mdb. In addition, in order to maintain up to the minute decisions and clarifications during the implementation of the TNC Transition program, a question and answer (Q&A) database will be made available for reference. This database will be made available on the OWP Share Drive under owpshare/Central/TNC/TNC Q&A.mdb.

Attachment

c: OEHS

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF HEALTH
DIVISION OF DRINKING WATER

TRANSIENT NONCOMMUNITY WATERWORKS PROCEDURES MANUAL

DECEMBER 2002

TRANSIENT NONCOMMUNITY WATERWORKS PROCEDURES MANUAL

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0.00 Purpose/Policy

The purpose of this document is to establish a rational and reasonable basis for staff decisions which will promote quality, timely and consistent service to the public and regulated community. This Manual has been prepared to help Virginia Department of Health, Division of Drinking Water (DDW) staff better understand and implement the public drinking water program for transient noncommunity waterworks. Furthermore, several areas of this manual will directly address the transition phase of this program from the Local Health Department (LHD) to DDW supervision by no later than July 1, 2003. This Manual applies only to a facility that has a system meeting the definition of a waterworks (see Section 1.00). It is the intent that the material herein is adequately presented so the program will be implemented and maintained in the best possible fashion.

This guidance will apply to all transient noncommunity water works. DDW staff will follow the guidance, policies and procedures presented in this document to direct and support implementation of Transient Noncommunity (TNC) waterworks activities.

0.01 Changes to the Manual

All clarifications, changes, etc., to this Manual will be sent to the field offices following established working memo (WM) format.

The latest manual will be posted on the OWP share drive in the TNC folder. Recommendations for changes to the manual for the purpose of improving the implementation of the transient noncommunity waterworks program are welcome. The specific recommendation, accompanied by an explanation as to why the change/modification is felt necessary, should be directed to the Small Systems Coordinator, Division of Drinking Water.

0.02 Q&A Database Questions from field staff requiring a response for clarification, or decisions which resulted in changes to the manual, will be maintained in a question and answer database for "up to the minute" updates and changes. This database is user friendly and accessible via the OWP share drive in the TNC folder. The database will be titled "TNC Q&A".

0.03 Disclaimer The guidance, policies, and procedures outlined in this document are intended to summarize existing requirements. Nothing in this document shall affect more stringent regulatory requirements. The guidance, policies, and procedures herein are not an adjudication or a regulation. There is no intent on the part of DDW to give this document that weight or deference. The guidance and procedures merely summarize how and on what basis DDW will administer and implement its responsibilities with respect to transient noncommunity water system activities. These policies are established to clarify any discrepancies regarding State and Federal Regulations **and is based on a reasonable understanding of the regulations and staff constraints**. DDW reserves the discretion to deviate from the guidance and procedures in this document if circumstances warrant.

1.00 Definitions

The Code § 32.1-167 and the Waterworks Regulations 12 VAC 5-590-10 states –
"Waterworks' means a system that serves piped water for drinking or domestic use to (i) the public (ii) at least fifteen connections or (iii) an average of twenty-five individuals for at least sixty days out of the year. The term 'waterworks' shall include all structures, equipment and appurtenances used in the storage, collection, purification, treatment and distribution of pure water except the piping and fixtures inside the building where such water is delivered."

The **Waterworks Regulation** 12 VAC 5-590-10 contain the following definitions:

1.01 **Community Water System** – means a waterworks which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

1.02 **Noncommunity Water System** – means a waterworks that is not a community waterworks but operates at least 60 days out of the year.

1.03 **Nontransient Noncommunity Water System (NTNC)** – means a waterworks that is not a community waterworks and that regularly serves at least 25 of the same people at least 6 months out of the year. It will be the policy of DDW to define "**regularly serves**" not in terms of hours or days per week, but for how long the waterworks is in operation in relation to the population served. **If the waterworks is a noncommunity, serves 25 or more of the same persons over six months out of the year, regardless of the amount of time the consumers are present at the facility, then the waterworks will be considered a nontransient noncommunity waterworks.** It is our policy to only permit systems serving churches or similar organizations that have permanent staffs of at least twenty-five or have day care or school facilities or similar activities.

1.04 **Transient Noncommunity Water System** – The classification **nontransient noncommunity water system** is a subset of the **noncommunity water system** classification. An inferred subset of the **noncommunity water** system definition is the **transient noncommunity** water system definition, which is not defined in the *Waterworks Regulations* but is as follows: means a noncommunity water system that is not a nontransient noncommunity water system. These waterworks serve at least twenty-five different individuals (transient consumers) for at least sixty days out of the year.

1.05 **Serves the public** is also not defined in the ***Waterworks Regulations***
but is an inferred subset of the transient noncommunity waterworks definition since it is a waterworks, but clearly not a community waterworks, nor would it normally meet the NTNC criteria.

Serves the public means that the owner of an establishment, facility, or other entity provides the means by which the public, including employees, may obtain water for drinking. This would include the use of drinking fountains, water dispensed at soda machines, providing cups of water upon request, or providing cups adjacent to a faucet for obtaining water for human consumption. This requires a conscious decision on the part of the owner of that establishment to provide water to the consuming public, whether they are employees or otherwise. Also, drinking water is simply water that is made available for drinking purposes. Drinking water **does NOT** include iced tea, coffee, or any other drinks made by mixing with water, ice, water processed through machines (vending machines), or foods that contain water. These are considered food products and not drinking water and therefore may be addressed by other applicable regulations. Providing drinking water **does NOT** mean providing drinking water via bottled water. It is our policy to only permit transient noncommunity waterworks serving the public drinking water (domestic use intentionally deleted) with the public further defined as serving at least twenty-five individuals daily for at least sixty days out of the year.

1.06 **Domestic use**.

Domestic use means normal family or household use, including laundering, bathing, cooking, heating, cleaning and flushing toilets. However, for the TNC program, domestic use has been intentionally deleted from use in defining these waterworks.
NOTE: See **Appendix A** for a flow chart explaining the various types of water works.

2.00 Administration

Oversight of the TNC waterworks will be conducted by the DDW. Implementation of the regulatory program for the TNC waterworks is clarified in this manual. Transition of this function from the LHD to the DDW will follow the procedure outlined below:

a. **Existing TNC Waterworks** The DDW will assume responsibility for existing TNC waterworks at the time of an Initial Survey by the DDW staff (DDW will prepare the survey report). It is strongly recommended that DDW and LHD staff perform a joint Initial Survey. Joint Initial Surveys must be coordinated and should be scheduled along with the LHDs routine survey schedule. The goal is to begin the transfer by July 2002 and complete the transfer by July 1, 2003.

b. **New TNC Waterworks** If an operation permit has not been issued to a new TNC waterworks in the planning or construction phase by January 1, 2002, DDW will assume responsibility for those waterworks. All Environmental Health Managers at the LHDs have been requested to contact the DDW District Engineer to convey all information on new TNC waterworks.

The general policy for existing waterworks is that physical facilities will be accepted as-is ("grandfathered") unless there is a documented bacteriological or nitrate water quality issue that poses a significant public health risk. The policy for newly discovered (but not permitted) transient noncommunity waterworks is that they will generally have to comply with all design requirements in the Waterworks Regulations, which include a properly located and constructed well. All existing transient noncommunity waterworks previously permitted or otherwise, which remain inactive for more than one year, shall comply with the design portions of the Waterworks Regulations as a condition of resuming business.

c. **DDW Responsibility** It is important to understand that the administration of the waterworks program impacts a number of VDH programs (LHD, Shellfish Sanitation, Marina's, etc) therefore it is a cooperative effort between the DDW and the other programs. The primary office responsible for administering the transient noncommunity waterworks program is DDW. The DDW central office staff will have programmatic control and will offer technical and procedural guidance. Any differences of opinion between programs should be discussed at the Field Office level directly with the local environmental health manager, etc. In all cases, the Director of DDW will be the final authority on any particular waterworks.

d. **Time accounting** for routine monitoring, reporting and record keeping functions shall be "Routine Surveys." The initial data gathering and file creation shall be included in Routine Surveys. BSSR and CCCP time shall be logged under SDWA.

3.00 Waterworks Application and Development

3.01 Approval Process for New or Expanding Waterworks

All new and expanding waterworks are to remain in compliance with the ***Regulations*** prior to issuance of permits. All DDW policies for the Application are to be implemented and followed within current policy as established in the most recent WM.

3.01.01 Comprehensive Business Plan

A waterworks Comprehensive Business Plan (CBP) is required of all new first time waterworks owners. All new waterworks, whether first time owners or otherwise, must be evaluated on their Technical, Managerial, and Financial (TMF) capabilities prior to operation permit issuance. This must be documented clearly in the working file. A 2-page TNC CBP form is located in **Appendix R**. This form should be explained and possibly completed by the DDW field staff for the owner's signature.

3.01.02 Plans and Specifications

All waterworks construction requires formal plans and specifications, therefore a licensed professional engineer's services are necessary (see 12 VAC 5-590-210 of the *Waterworks Regulations*). **An exception to this policy is outlined in section 3.01.04**. An application for a permit is also required and shall be submitted with the plans and specifications. A review time of 60 calendar days from the date of a project's original submission is the present goal of DDW. For all construction, the plans and specifications must be reviewed and approved by the DDW prior to issuance of a permit. It shall be the responsibility of the District Engineer to obtain from the owner or the owner's consulting engineer, all documents and data required for review. DDW will perform the technical review and issue an approval letter and construction permit to the owner. A copy of the approval letter and permit will be forwarded to the appropriate local health department.

3.01.03 Exceptions to Part III of the *Waterworks Regulations*

Engineering Field Directors should note specific exceptions allowed for Noncommunity Waterworks in Part IV of the Waterworks Regulations, which do not require formal design exception requests for the Division Director's signature.

Whenever an exception to the design and construction criteria of the *Regulations* (see Part IV, 12 VAC 5-590-1240) is considered, it must ensure that the facility complies with the *Regulations* while not allowing any unreasonable risk to public health.

3.01.04 Exemption to PE requirement for Plans and Specifications

It is the policy of DDW, as confirmed by the APELSCIDLA Board (DPOR), to exempt the design of TNC waterworks from the P.E. licensure requirements of the Code of Virginia, Title 54.1, Chapter 4, Section 54.1-402, and the Virginia Waterworks Regulations under the following conditions:

• The waterworks is a transient noncommunity waterworks serving no more than a total of 100persons per day. This must be documented in writing and signed by the owner.
• Waterworks must be a direct delivery system without any treatment, meaning that the system consists only of one source, small pressure storage tank, and single service connection (one structure).
• Single service connection consists of a structure with area less than 5,000 square feet. The determination of square footage will be performed using the outside perimeter of the single service connection.

Example #1: **Allowed Exemption**:
A single story structure is 80ft long and 50ft wide
80ft long x 50ft wide = 4,000 square feet

Example #2: **Not Allowed for Exemption**:
A 5-story structure is 80ft long and 50ft wide
80ft long x 50ft wide x 5 (stories) = 20,000 square feet

• Construction of the well must be by a well driller with Class A contractor license. This can be verified through online access of licensed well drillers on the DPOR website.
• Construction of remainder of waterworks must be by a master's level plumber or Class "A" contractor.
• Information described in the checklist in **Appendix D** must be submitted by the waterworks owner in lieu of plans, specifications, documents, and designs normally prepared by a licensed professional engineer. This information may also be better completed by the well driller or Class A contractor since they would normally be more knowledgeable in the completion of the checklist and diagram.

This exemption applies to new waterworks and modifications to existing waterworks that satisfy all the conditions listed above. Refer to **Appendix E** for example sketches to be given to owners wishing to implement this exemption.

3.01.05 Construction Monitoring

a. Overall, the owner is responsible for well development, construction, insuring proper disinfection of storage tanks and waterlines, flushing, and testing of bacteriological samples in accordance with 12 VAC 5-590-1080 and 12 VAC 5-590-1210. DDW staff should monitor the construction of new or existing waterworks only on an as-needed basis as determined by the Engineering Field Director. Site visits for monitoring construction are to be identified administratively as "Special Inspections" when input on Time-Trac.

b. Following receipt of the Completion Statement, the district engineer, or representative, shall make a final inspection before the new construction is placed into operation. After a final inspection and receipt of satisfactory developmental results, an operation permit shall be issued or amended as appropriate.

3.01.06 Modifications to Waterworks

All changes affecting capacity, hydraulic conditions, operating units, the functioning of water treatment processes or the quality of water to be delivered must be approved by DDW before any such changes are made. This includes storage, distribution, treatment, pumping, etc. See 3.01.02, 3.01.03 and 3.01.04 for engineering plans and specifications. Repair work such as replacement of a well pump of the same size and capacity, pre-pressurized tank, waterlines in place of the same size, etc., do not require approval.

In addition, for TNCs such as restaurants, motels, etc. that have special client dictated Point of Use treatment requirements for process water quality etc. that will not detrimentally effect the water quality, formal approvals are not required. The owner must be requested to provide suitable information such as manufacturers literature, a sketch and a description of the device's purpose in order to make a determination of impact to water quality. A letter from the Field Director similar to a PER letter stating that the proposal is acceptable is sufficient. These proposals should be accounted for under Reports in Time Trac.

3.02 Source Development

All new sources for transient noncommunity waterworks will be handled using the following procedures:

a. **Initial contact** with the waterworks owner will normally take place at the local level. The local health department staff has been requested to refer the waterworks owner to the appropriate DDW field office. The DDW field staff must review with the owner the basic requirements for developing a source and operating a waterworks. A preliminary engineering conference should be held. All new construction shall be in accordance with the *Waterworks Regulations*.

b. **Well Site Approval**. A well site evaluation must be made by the DDW staff. DDW staff will be responsible for preparing a well site approval letter, with appropriate attachments, to the owner. This letter should also outline to the owner those requirements for well construction, plans and specifications, and sampling that will apply to the situation. Once it has been determined that the waterworks owner will begin development of the approved well site, DDW field staff will assign a unique Public Water Supply Identification (PWSID) number for the waterworks (for new waterworks) which is needed for sample collection and permit issuance. The well site approval letter **(Appendix P)** authorizes the owner to drill, case, and grout the well, perform the yield and drawdown test, and determine water quality (sampling). Further construction shall not commence

until issuance of the construction permit. The plans and specifications, well lot plat **(Appendix Q),** and dedication document are prepared after the well yield and water quality have been determined to be acceptable. These documents are required prior to issuance of all new waterworks permits, and required from existing waterworks requiring a construction permit for expansion.

c. **Well Yield and Drawdown**. The well yield and drawdown testing is normally required to be performed once well development has been initiated. This information must be recorded by the well driller (**Appendix C**). A 48 hour well drawdown is necessary to determine source availability and recharge potential. However, reduction of the 48hr may be granted to 24hr if the source is expected to have a low demand for use (i.e. 4 to 9 gpm). If the system demand is 3gpm or less, a minimum pump test of 8hrs is required.

d. **Developmental water samples**: Please refer to the most recent Working Memo for up to date guidance. Traditionally, all chemical, radiological, and bacteriological analysis must be performed as would be required of a community waterworks.

1. **Bacteriological**. At least 9 bacteriological water samples tested by the Most Probable Number (MPN) method must be collected and analyzed. Should any of the initial 9 MPN samples indicate the presence of coliform bacteria, an additional 11 MPN samples shall be collected and the geometric mean of all 20 samples determined. Since development of the well site usually involves no more than 48hrs, it is recommended for the owner to collect all 20 MPN samples during the drawdown phase. Refer to section **8.02.06** for further guidance.
2. **Radiological**. Current policy is to require one radiological sample per source developed.
3. **Inorganic, Metals, and Organic**. Current policy is to require these samples.
4. **SOC Samples.** In accordance with current policy SOC samples may be required. At development is the best, and sometimes only time, we can get a snap-shot of the source. It is the DE's responsibility to determine, based on "additional considerations" ("Vulnerability assessment regarding synthetic organic chemicals."), whether SOC samples will be required.

e. **DCLS:** The chemical sample containers may be obtained from the Richmond Division of Consolidated Laboratory Services, or from state certified laboratories. Please note that these development samples may be submitted to a private laboratory certified by DCLS to analyze potable water samples. DCLS, or a private lab, will submit all sample results to the appropriate DDW Field Office. Ultimately, this is the responsibility of the waterworks owner. The results of chemical analyses with an explanatory transmittal letter are to be forwarded to the owner with courtesy copies to LHD.

3.03 Existing

There are many situations in which facilities are served by existing wells. Some of these waterworks may be operating as transient noncommunity waterworks while others may be operating as private waterworks (see 2.00b).

The following are examples to illustrate and clarify how to handle some existing situations we may come across.

a. Mrs. Brown has owned a country store that is served by an EXISTING WELL for several years. In addition to selling grocery items she also sells fresh baked pizza and bread. The baked goods are only for take-out service (no sit-down service is offered) and only prepared iced tea and canned drinks are served. Mrs. Brown now plans to add sit-down service and expand her menu. Even though an existing well has served this establishment for several years, Mrs. Brown must meet all requirements of the Waterworks Regulations (including a properly located and constructed well) because she is changing the use and/or expanding. Evaluation of the existing well reveals that it does not meet the location and construction requirements of the Waterworks Regulations; therefore, it can not be approved.

b. A bed and breakfast has four bedrooms and a staff of three. It is open year round and is normally filled on Friday and Saturday nights. Meals are prepared on the premises for the guests. Because there are less than 25 persons being served daily, this bed and breakfast does not constitute a public water system. PIM 98-02 gives guidance to the LHD personnel on insuring the B&B has an acceptable water supply. If a restaurant were added which serves at least 25 people per day at least 60 days per year, then it would be classified as a transient noncommunity waterworks. In SDWIS, we would list two service areas: Restaurant and Hotel/Motel with Restaurant being the primary service area.

c. A convenience store sells hotdogs, nachos and fountain drinks in a small area next to the doughnut case. Since there is no seating area, it does not constitute a restaurant and the LHD has no regulatory authority. The consuming public can only obtain water through the fountain machine via a small button to dispense water where the Hi-C Lemonade would normally be served. At least 40 people are served daily. This constitutes a public water system because drinking water is available to the public.

d. The county fairgrounds host the County Fair each year for 10 days. Over a thousand visitors are expected. This is not a public water system since it does not serve water to at least 25 people per day at least 60 days per year. PIM 98-02 gives guidance to the LHD regarding approved water supply. DDW personnel should evaluate the use of county fairgrounds throughout the year since it's possible they do serve 25 people per day at least 60 days per year.

e. Mr. Jones owns property with an EXISTING WELL. He has notified VDH that he wants to develop a campground on his property with approximately 100 campsites. Even though an existing well (20 feet of casing and cement grout) is located on the property, Mr. Jones must meet all requirements of the Waterworks Regulations (including a properly located and constructed well) because he is establishing a new noncommunity waterworks. The existing well can not be approved.

3.04 Cross Connection Control (CCC)

As a safeguard to public health, each waterworks owner **must** establish and maintain a program of cross connection control and backflow prevention. The program must be approved **prior** to issuance of the operation permit. For existing waterworks without an approved program, it is suggested that this requirement be addressed as part of the initial sanitary survey. A program format, suitable for a transient noncommunity waterworks, is included in **Appendix F, and Appendix G** may be used as an educational tool for owners. With the owners' acceptance of this program, documented by his/her signature, evaluation, and approval by DDW, the program can be approved for implementation **(See Packet in Appendix S)**. During follow-up inspection visits, the program should be evaluated for implementation and indicated properly on the survey report.

It is important to keep in mind that the LHD also inspects for CCC prevention during their foodservice sanitary surveys. According to LHD staff, some of the CCC items checked for during these inspections are:

1. Hoses connected to faucet bibs.
2. Threaded faucet bibs without hose connected.
3. Flexible sprayer at dishwashing scrap sink which can extend into flood rim of sink.
4. Automatic detergent dispensers connected to a water line at mechanical warewashers and warewashing sinks.
5. Submerged water inlet in steam table connected to a water service line.
6. Water service line connected to a dipper well which can or does extend into the flood rim of the well.
7. High pressure washer connected to a water line.
8. Food steamer connected to a water line.
9. Non-potable water source (ex. reclaim tank) connected to potable supply line.

10. Boiler make-up or chemical additive tank connected to a boiler.
11. Any water faucet which extends or is not air gapped above flood rim of a fixture.
12. Food equipment drain connected directly to a sewer line.

DDW staff should limit CCC investigation to items listed on the sanitary survey form and recommended items listed in **Appendix H**. If other obvious CC are noted, be sure to consult with LHD Staff prior to making a formal recommendation to insure consistency with LHD recommendations.

4.00 Sanitary Survey

4.01 Initial Survey

The first sanitary survey of an existing TNC should be performed jointly with an Environmental Health Specialist from the LHD. This survey will serve multiple functions:

- Introductions and explanation of the transfer of oversight.
- Technical Assistance to the owner/operator on the program requirements, written reports, etc. A packet of information **(Appendix S)** should be provided to the owner by DDW at this time, and the information reviewed and completed as much as possible. TNC waterworks are required to prepare and follow a Bacteriological Sample Siting Plan (BSSP) and Cross-Connection Control Program (CCCP). DDW will assist the owner in completion of these documents at the time of the Initial Sanitary Survey. Sample forms are provided in **Appendix S**. Copies of the completed BSSP and CCCP will be returned with the sanitary survey report to the owner.
- Physical inspection of facilities, and completion of a Sanitary Survey Report.
- Gather information needed to prepare an Engineering Description Sheet for the waterworks. A sample checklist (**Appendix I**) for the inspecting staff is available as a guide.

It is the intent of the Initial Survey to introduce all parties involved with the water system (i.e; owner, DDW, LHD) and to protect the public health through education and technical assistance. One concern noted is the possibility of too many comments and recommendations being made during the Initial Survey. However, failure to list all the identified deficiencies initially could lead to a poor working relationship between all parties involved and, in turn, could alienate the owner. Use professional discretion and keep recommendations within the Regulations.

Therefore, in order to maintain consistency throughout the DDW, maintain and enhance our working relationship with the LHD, and to achieve the highest level of cooperation from existing TNC owners/operators, emphasis should be placed on those items with a direct impact on public health over those that are not. In order to assist in identifying significant type deficiencies such as these, a list of examples is available in **Appendix J**. It is recommended that the survey report reflect all deficiencies and recommendations. However, it is dependant on a case-by-case need and the DE/Inspectors professional judgement in the field.

4.02 Grandfathering and the Initial Survey

Keep in mind that we are to “grand-father”, or accept these waterworks as-is unless there is a public health risk identified. Since the construction of the facilities, for existing waterworks, has already been completed, the requirements for a concrete apron, sample taps, etc, should apply only when public health is an issue at risk. The initial inspection should identify those items that are necessary per the Regulations, and items like concrete aprons would be recommended not required. For new waterworks, a concrete apron would be required. Sample taps are required for existing waterworks when there is treatment requiring raw water sampling.

4.03 Subsequent Surveys

Routine sanitary surveys will be scheduled for a frequency of not less than once per two Years or more frequently as determined by the Engineering Field Director.

4.04 Report

Refer to WM # 851 for the format of the Sanitary Survey Report.

4.05 Survey Tool

The TNC Survey tool in **Appendix** B may be utilized to document information concernning TNC's prior to the Initial Survey, upon discovery of a new waterworks, change in ownership, etc. TNC P-14's may be used for collecting this data via phone calls. However, a site visit is required by DDW Staff for confirmation of reported data.

5.0 Permits

Care must be taken to assure that the Permits are issued to the **legal owner** of the waterworks. Generally, Operation Permits are not issued to a waterworks owner until an approved cross connection control program has been developed and, if necessary, an appropriately licensed operator has been retained by the owner. All waterworks owners who propose plans and specifications must be notified of their responsibilities in order that the necessary documents can be provided before the Operation Permit is issued. All new construction letters must inform the waterworks owners of these responsibilities and point out that these items must be satisfied before the Operation Permit can be issued.

It remains the intent of the Division that any waterworks owner who develops a waterworks and complies with the provisions of the Waterworks Regulations be issued an Operation Permit which contains no citations of violations. For waterworks classification guidance, see Operator Requirements, Section 7.0.

5.01 Operation Permits

An Operation Permit should be issued immediately after completion of the Initial Sanitary Survey for existing waterworks, but in no case later than 12 months following the Initial Sanitary Survey. Waterworks which have a joint permit issued from the LHD that identifies a PWSID shall have a separate Waterworks Operation Permit issued by DDW upon expiration of the joint permit. The format of the Waterworks Operation Permit shall be the same as that for Community and NTNC waterworks. An Engineering Description Sheet shall be included. The BSSR and CCCP should be completed prior to issuance of an Operation Permit.

5.02 Variances to Metering of Total Water Production

Transient Noncommunity waterworks using less than 10,000 gpd may be issued a variance for the installation of a water meter, without a formal request, even if the design capacity of the waterworks is more than 10,000 gpd. Refer to **Appendix** S for this variance form. If the waterworks has a treatment plant that requires knowledge of the volume of water produced, then a meter will be required. A meter may also be required if a mass drainfield is used for wastewater treatment. Consult with the LHD to verify if a drainfield is used and if capacity is a concern.

Existing Waterworks- General policy for existing waterworks is that the physical facilities will be accepted as-is (grand-fathered) unless there is a documented bacteriological or nitrate water quality issue that poses a significant public health risk. Therefore, a variance is appropriate and should be issued. There must be a very strong case that the type of treatment requires a meter

before we stray from our general policy to accept the facility as-is. However, if an existing waterworks installs hypochlorination at a later date, a meter will be required.

New Waterworks- A meter shall be required for all new waterworks using disinfection (i.e. hypochlorination).

All operational variances, including variances to metering, will be evaluated on a case-by case basis. Variances for new waterworks will have both the operation permit and the variance(s) processed simultaneously.

5.03 Permit Revocations

When a permitted waterworks has discontinued supplying water, is no longer a waterworks, has a change of ownership, or has been abandoned, the District Engineer, with concurrence from the Field Director, will send a notice by certified mail, return receipt requested, and regular mail to the permit holder to the effect that it is our intention to revoke the permit. The notice shall also contain a request that the permit holder notify the District Engineer in writing that they do or do not object to the revocation of the permit. Two courses of action could be followed from this point, depending on whether or not the certified mail is returned undelivered. (1) If the certified mail is returned undelivered, the District Engineer should make every effort to contact the permit holder in person or by telephone. If the attempts are unsuccessful, then the District Engineer, with concurrence of the Field Director, will prepare a letter of revocation for the Division Director's signature. The letter containing the Division Director's signature will be mailed to the permit holder at the last known address by certified mail, return receipt required, and regular mail. If the letter is returned undelivered, it shall be retained in the correspondence file as evidence of notification and will serve as authorization to revoke the permit in question. (2) If the permit holder notifies the Division in writing that he does not object to revocation of the permit, a letter will be prepared for the Division Director's signature revoking the permit. If the permit holder objects to revocation of the permit, then a hearing must be held, in accordance with Section 12VAC5-590-160 of the Waterworks Regulations. All correspondence is to be courtesy copied to the LHD.

Form letters for revocation of an Operation Permit and the cover letter for the DDW Director is in **Appendix K**.

6.0 Data Systems & Data Entry

6.01 Notice of Violations

Violations shall NOT be issued by DDW for occurrences prior to assumption of surveillance by DDW. Where violations are cited in SDWIS, resolution and database "clean-up" by DDW is expected.

6.02 SDWIS

Data entry into SDWIS may begin upon transfer of existing files from LHD, or after the Initial Sanitary Survey. The Inventory and Legal Entities information shall be completed no later than 12 months after the Initial Survey.

6.03 R & R

Milestone dates will be entered into R&R as they are for community and NTNC waterworks.

6.04 SDWIS Population Entry- "Split Populations"

For the purposes of SDWIS data entry, the waterworks populations are allowed to be entered in conjunction with the months. Be aware that the number of bacteriological sample requests

(monthly vs. quarterly) are based on the cumulative population entered into SDWIS and may cause a waterworks to be misinterpreted as requiring monthly samples when, in fact, quarterly samples are required.

Example:

*From 9/1 through 4/30, waterworks Beta has a transient population of **40***
*From 5/1 through 8/31, waterworks Beta also has a transient population of **970***
This example would indicate a total population in SDWIS of 1010 when, in fact, the waterworks serves 970.

R&R still has an override for manual entry for waterworks whose sample frequency is not based strictly on population. All manual overrides must be completed 60 days prior to the quarter the sample is due in order to insure DCLS invoicing.

In summary, if the population reaches 1000 or more, DCLS will ship and charge for monthly sample frequencies. Less than 1000 population listed in SDWIS will indicate quarterly monitoring, based on population. Any changes will have to be performed manually.

7.0 Operator Requirements

Normally, TNC waterworks will not be classified and therefore will not be required to have a licensed operator, unless it has treatment established for health concerns (i.e; Nitrate, Bacteriological, and Treatment Techniques). For TNCs in the transition, this may require investigation (i.e.; file search, MPN's. etc) to identify the intended purpose for this treatment because some treatment devices may be utilized for both health and aesthetic purposes. Waterworks employing hypochlorination only would not be classified or require a licensed operator. Normally UV treatment, on its own, would not require classification because a UV device must be followed by chlorination if the intended purpose of the UV was bacteriological problems. The type of chlorination may then dictate classification. UV treatment added for other non-health related reasons (i.e.; added protection, personal choice, sales rep, etc) should not generally create a health concern.

Sources that are determined to be under the influence of surface water employing treatment techniques are to be classified. Solution chemical feeds with caustic chemicals should require an operator due to the potential safety/health hazards involved. For waterworks utilizing the types of treatment noted above, the procedures used to classify TNC waterworks shall be the same as that used for community and NTNC systems. Fixture point-of-use devices generally do NOT require an operator, and should not warrant the classification of the waterworks. Operator requirements for classified waterworks will follow current DPOR Regulations. A courtesy copy (cc) to DPOR on all classification determinations is required.

8.0 Monitoring

8.01 General

Sampling requirements to monitor water quality at TNC waterworks are minimal when compared to community waterworks. Only quarterly or monthly bacteriological and annual nitrate/nitrite samples will be required, barring exceptions. (See the *Waterworks Regulations*, Part II, Article 1 12 VAC 5-590-340 *et seq*. for more details) In addition, raw MPN samples may be required for certain waterworks (see 8.02.07).

Please note that, by Code, the owner is responsible for ensuring that all samples are taken. DDW staff may collect Quality Assurance (QA) bacteriological samples as deemed necessary. Under no circumstances are DDW staff responsible for the collection and analysis of compliance samples.

8.02 Bacteriological

Bacteriological monitoring of TNC waterworks is governed by the Total Coliform Rule as detailed in 12 VAC 5-590-370A and 12 VAC 5-590-380 of the *Waterworks Regulations*. A comprehensive bacteriological monitoring reference titled "A Guide to Bacteriological Sampling of Public Water Supplies" is available for download from the VDH web site. This guidance will serve as an invaluable training aid and reference for both waterworks owners and others. The reader must be aware that the manual is written to address primarily community waterworks and as such, refers to a monthly sampling frequency, etc. Many TNC waterworks have a limited number of acceptable sampling locations. However, a bacteriological sample siting plan (BSSP) is still required for all public waterworks.

8.02.02 Sampling

It is the responsibility of the waterworks owner to collect and submit for analysis all required bacteriological samples. (12 VAC 5-590-340 of the *Waterworks Regulations*) These required samples may be submitted to the DCLS for analysis. For current sample fee schedule, contact DCLS. The owner may elect to use a state certified laboratory for such purposes. A list of approved private laboratories is updated periodically by DCLS and is maintained on the VDH website. All bacteriological results will be available to the appropriate local health department through their on-line access with the bacteriological database on "owpnt1" until further notice. Prompt notification by DDW staff to the owner, when additional samples are required, is necessary.

Five sample types will generally characterize bacteriological sampling requirements for TNC waterworks.

8.02.03 Routine samples

These are the bacteriological samples required on a regular (in most cases quarterly) and on-going basis. Also included in this category are additional samples required the monitoring period following when one or more total coliform positive (TC+) sample(s) is/are detected. In accordance with current policy, for those waterworks required to sample at a frequency of less than 5 routine samples per monitoring period (quarterly, monthly), five routine samples shall be collected during the **following monitoring period** when a TC+ sample is detected. These samples shall be collected from points representative of the waterworks. These samples should be collected at intervals during the monitoring period to provide continuous bacteriological monitoring. For waterworks required to monitor quarterly, monitoring should begin with the 1st month of the quarter and at evenly spaced intervals (once every 2 weeks). Use the following guidance for determining the proper sampling frequency for TNC's:

a. TNC waterworks will conduct Monthly monitoring for:
1) Any TNC serving a population of 1000 or more persons at least 60 days out of the year
2) Surface water sources
3) GW sources determined to be under the influence of surface water

Example: A campground that serves 1200 persons per day during the months of May through September, and a population of 40 persons per day for the remaining months of the year will require monthly bacteriological sampling since it exceeds 1000 persons at least 60 days out of the year

b. TNC waterworks will conduct Quarterly monitoring for:
1) TNC's serving a population of less than 1000 persons
2) GW sources not under the influence of surface water

Example: A campground that serves 940 persons per day during the months of May through September, and a population of 40 persons per day for the remaining months of the year will require quarterly bacteriological sampling since it serves less than 1000 persons

c. Exception to Policy:
If the source is completely unavailable for use for the entire monitoring period (monthly, quarterly) then that monitoring period will not have to be sampled. This must be clearly documented in the working file for each qualifying monitoring period.

Example 1: A campground on a monthly monitoring period (population >1000) for bacteriological samples is closed from October 5th through April 5th of the following year. During the remainder of October through the first of November, only 3 staff members are present winterizing the waterworks. Since it is in use during the Months of October and November, and also April, a sample would be required for each period(month) the system is in operation. However, the months of December through March would not require a sample since the source is not in use at all.

8.02.04 Repeat samples

These are the samples required to be collected should a TC+ sample be detected. Owners required to collect one routine sample per quarter shall collect 4 repeat samples for each TC+ sample result determination. At least one repeat sample shall be collected from the location where the TC+ sample was collected. All repeat samples shall be collected on the same day and within 24 hours of notice that a TC+ sample has been detected. This is a regulatory requirement; however, lab operation schedules should be considered before collecting and submitting required bacteriological samples, including repeat samples. If only one tap is available, the repeat samples shall be collected over a 4-day period (one sample per day) OR be collected all on the same day. Additional repeat sampling is not required after a PMCL violation has occurred. However, additional sampling to determine the source of the contamination may be necessary and **is encouraged**. DDW Staff are to follow recent sampling guidance in reference to DCLS protocol for sample submittals.

8.02.05 Resample or Replacement samples

A resample or replacement sample is required when a sample cannot be analyzed or the results of the analysis are inconclusive. The reason for the unsatisfactory sample should be noted by the laboratory in the lower right-hand portion of the Bacteriological Analysis Input Form along with a request for the collection of a “resample” from the original sampling location.

8.02.06 Well Development Bacteriological Samples

These samples are required to characterize the bacteriological quality of newly developed wells or existing wells of unknown bacteriological quality proposed for use in a waterworks or existing approved wells exhibiting fluctuating bacteriological quality. This sampling procedure should be commenced only after the well has been properly disinfected to eliminate residual contamination from construction activities Disinfection is generally accomplished by adding Clorox to the well and exercising the well pump until a strong chlorine odor is detected at the sampling location. Refer to **Appendix L** for further procedural information. The recommended collection procedure is to collect 9 samples for MPN analysis at regular intervals, i.e., each hour, during the latter stages of the yield and drawdown test as well as other developmental samples required. For bacteriological, provided all 9 samples are free of total coliforms, no additional pre-development bacteriological sampling is required. Should total coliforms be detected in any of the 9 samples, the sampling procedure must be continued such that eleven (11) additional samples for MPN analysis are collected. A total coliform geometric mean of these twenty (20) samples will be determined in accordance with the procedure outlined in **Appendix M**. Groundwater sources indicating a geometric mean of $\leq$ 3 total coliforms per 100 milliliters (mls) may be utilized as part

of a waterworks without disinfection. Sources indicating a geometric mean of > 3 and < 100 total coliforms per 100 mls may be utilized if disinfection facilities are provided. Sources indicating a geometric mean of ≥ 100 total coliforms per 100 mls exhibit an unacceptable level of bacteriological contamination for disinfection alone (see *Waterworks Regulations* 12 VAC 5-590-840.A).

8.02.07 Routine Raw Water MPN Analysis

Raw Water MPN samples will be required for those waterworks using disinfection or treatment that may alter the bacteriological quality of the water. This is necessary since the chlorine may be neutralizing the presence of raw water coliform bacteria, which could identify potential surface water influence.

Groundwater sources will be grouped as a (1) karstian well (2) non-karstian well or (3) spring. **Karstian wells** will need one raw water MPN sample at the same frequency as the routine bacteriological sample(s). **Non-karstian** wells will need one raw water MPN sample per year. Springs will need a raw water MPN sample at the same frequency as routine bacteriological sample(s). These sampling requirements only apply to sources which chlorinate or provide some other treatment that may alter or affect bacteriological quality prior to the approved bacteriological sampling locations. Groundwater sources without chlorination or treatment as described above do not need to collect any additional samples.

8.03 Nitrate/Nitrite Sampling

Nitrate samples are required annually from each point of entry to the TNC system. Prior to the Initial Survey, the Nitrate results must be reviewed from 1993 to the present. If routine nitrate sampling has not been performed, then a sample is required by the end of the current calendar year.

One Nitrite monitoring at the entry point is required if any previous result of combined Nitrogen is >0.5 mg/L or if the system has no historical total nitrate + nitrite, nitrate, or nitrite monitoring... The Nitrite repeat monitoring frequency for any waterworks owner shall be quarterly for at least one year following any one sample in which the concentration of Nitrite is ≥ 50 percent of the PMCL. The commissioner may allow a waterworks owner to reduce the sampling frequency to annually, during the quarter which previously resulted in the highest result, after determining the analysis results are reliably and consistently less than the PMCL. “Reliably” and “consistently” can be defined as four consecutive quarter results detecting Nitrite at less than the PMCL.

Compliance with the PMCL is determined based on one sample, from each sampling point, if the levels of these contaminants are below the PMCL’s. Where nitrate or nitrite sample results exceed the PMCL, the waterworks owner shall take a confirmation sample, from the same sampling point that exceeded the PMCL within twenty-four hours of the waterworks' receipt of the analytical results of the first sample. The results of the initial and confirmation sample shall be averaged to determine compliance. Waterworks owners unable to comply with the 24-hour sampling requirement must immediately notify the consumers in the area served by the waterworks in accordance with the Federal Public Notification Rule. Waterworks exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample. The commissioner **may** require more frequent monitoring. If the averaged results are greater than 10mg/L, then a Notice of Violation (NOV) must be issued and treatment should be provided.

As a note, TNC waterworks detecting Nitrate at greater than or equal to 50%of the PMCL are not required to increase to quarterly monitoring, as is the case for Community and Nontransient Noncommunity waterworks.

8.04 Nitrate Allowances

If a chemical analysis indicates a nitrate level greater than 10 mg/L, a noncommunity waterworks may be allowed to operate with a level up to 20 mg/L if the owner demonstrates:

1. Such water will not be available to children under 6 months of age; and
2. There will be continuous posting of the fact that $N0_3$-N levels exceed 10 mg/L and the potential health effects of exposure; and
3. Health officials will be notified annually of $N0_3$-N levels that exceed 10 mg/L; and
4. No adverse health effects result.

Waterworks exercising this option shall receive a NOV for each monitoring period when an exceedance of the PMCL occurs.

There is no allowance for nitrite concentration exceeding 1 mg/L.

8.05 Operation Reports

Operation reports will NOT be required for TNC waterworks that do not meter and do not provide treatment. Point-of-use devices (cartridge filters, etc.) generally do NOT require operation reports. Otherwise, monthly operating reports shall be submitted by the owner and evaluated according to standard procedure. Quarterly reporting of monthly production may be allowed for waterworks that do not provide treatment.

9.0 Groundwater Under Direct Influence of Surface Water (GUDISW)

All transient noncommunity waterworks, which utilize groundwater as their source, must conduct a determination as to whether or not the system is influenced by surface water. These types of sources are usually wells, springs, and infiltration galleries. If the LHD has completed a GUDISW evaluation for existing TNC waterworks, then it will be accepted. Otherwise, DDW shall make the determination, in accordance with the Waterworks Regulations. Exceptions to a LHD determination must be coordinated through the Central Office via the Small Systems Coordinator.

For new wells, we must determine surface water influence. DDW will continue to use well log, pump test, chemical and bacteriological data to make an initial determination.

a. Karstian wells need additional MPN sampling for 12 months to better access long-term possible surface water influence. One sample/month plus additional samples collected after eight rainfall events will be required. District Engineers can compress the sampling schedule to two samples/month for six months plus eight rainfall events if desired. Upon completion of the initial 12 month (or six months) sampling period, new wells in karstian geology will revert to quarterly monitoring as described in 8.02.07.

   Some localities have expressed an interest in sampling for surface water influence at the time of well development. Therefore, the LFO has worked with a consulting firm to develop the following protocol designed to make an accurate and early determination of surface influence for a karstian well.

   1. A well site inspection will be conducted as usual; however, the well site approval letter will stipulate that the water well completion report will be submitted for evaluation upon completion of the well.

   2. Upon receipt, the well log will be evaluated to help determine the well's potential for surface influence based on parent material and geological structure (i.e., site located in karstian or non-karstian geology--is site underlain with limestone or dolomite, does it pass through caverns, etc.). Based on this evaluation, the

owner will be advised of yield and drawdown test requirements and provided with a list of developmental sampling requirements.

3. If the well is determined to be located in karstian geology, the following development procedure will be used to determine surface influence:

   (a) Water quality monitoring (inorganic, organic, volatile organic, metals, radiological) will be conducted during the yield and drawdown test. Well(s) will be pumped continuously at maximum pumping rate for a minimum duration of five (5) days. The pump rate should be sustained at a constant rate during the last 48 hours for yield determination.

   (b) Well pump discharge and suction lines will be chlorinated prior to pumping. No chlorine is to be present during the five (5) day pump test.

   (c) Bacteriological testing will be conducted for total coliform using the multiple-portion decimal-dilution (MPN) method. A total of twenty (20) samples each should be collected from the pump discharge at 6 hour intervals during the five (5) day yield and drawdown test.

   (d) Turbidity, temperature, pH and conductivity measurements will be required at 6 hour intervals during the five (5) day test period. These samples will also be collected from the pump discharge.

   (e) A Microscopic Particulate Analysis (MPA) will be performed on samples collected during the final 24 hours of the yield and drawdown test.

4. The source will be deemed to be surface influenced, only if:

   (a) Source is found to have confirmed fecal contamination, or

   (b) The results of the total coliform MPN testing indicates that more than 10% of the samples exceed 100 organisms/100 ml., or

   (c) MPA results indicate the presence of rotifers, diatoms, coccidia, plant debris, insect parts, or Giardia cysts in the source water.

5. If deemed to be surface influenced, the owner will be notified in writing of same and advised that filtration must be provided in order for the wall to be utilized.

6. The procedure outlined in Paragraph 3 above is not cast in concrete and the owner/developer may propose an alternate method to determine surface influence. Any proposed alternative should address this determination in a logical manner and meet the intent of 12 VAC 5-590-430 of the *Waterworks Regulations*. Concurrence of Technical Services, DDW will be needed prior to the implementation of any proposed alternative evaluation method.

B. Non-karstian wells can continue to be evaluated solely by the development samples followed by the yearly sample described in 8.02.07.

C. New springs will be required to conduct raw water MPN sampling prior to being placed into service. The 12 monthly samples plus additional samples after eight rainfall events (or compressed six month schedule) will generally be required. District Engineers can modify the sample schedule to take into consideration any previous and properly done MPN sample results.

9.01 Making the Determination

In accordance with 12 VAC 5-590-430 of the Waterworks Regulations, a source is determined to be under the influence of surface water when it meets one of the following criteria:

- It has been directly associated with a biological waterborne disease outbreak such a Giardiasis, or if it has been directly associated with chemical contamination from the surface
- If a sanitary survey reveals that surface water may directly enter the source either through structural defects or through nearby surface water bodies, sinkholes, troughs, drainage ways, or other suspect geological features.
- The source turbidity, temperature, pH, or conductivity fluctuate following climatic events or fluctuate relative to nearby surface bodies of water
- The source exhibits the presence of diatoms, rotifers, coccidia, plant debris, insect parts, or Giardia cysts as identified by particulate analysis.
- Or having record of, or confirmed fecal coliform contamination (i.e. one fecal coliform positive colony)

9.02.01 Procedure Used for Determination

The regulatory procedures have been outlined in the Groundwater Sources Under Direct Influence of Surface Water - Determination form (**Appendix N**). Applicable portions of the evaluation form are to be conducted until the source is determined to be under the influence or determined not to be under the influence. The evaluation form was developed for statewide use for community and noncommunity waterworks. Items of significance, not shown on this form, may be noted on this record as desired. The form is a guideline rather than a checklist.

Please note that source history, geology, well construction, and water quality are major considerations in the determination. Much data can be obtained through a file and records review.

10.00 Enforcement

The primary purpose of enforcement activities is to ensure that the public is protected against the use of impure water. All enforcement/compliance is to be handled in the same manner as with NTNC and Community waterworks. Bacteriological results will be checked routinely to ensure compliance with the TCR. Nitrate samples will be tracked to ensure annual samples are collected and analyzed. Positive results will be researched and handled the same as with Community and NTNC waterworks.

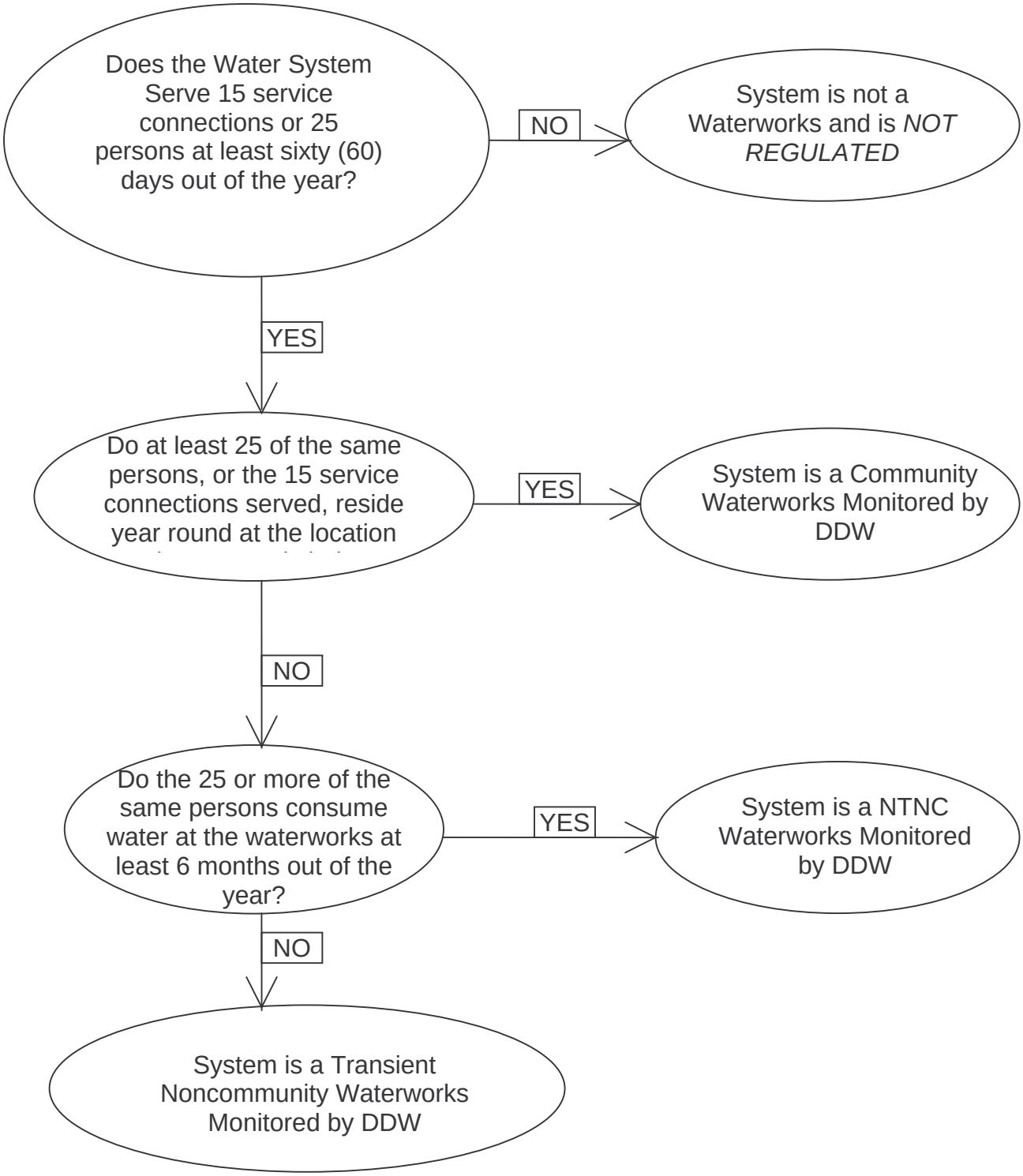
11.0 Coordination with LHD

The LHD Director shall be copied on all correspondence, permits, sanitary surveys, and NOVs issued by DDW. The LHD should be contacted prior to investigation of complaints concerning establishments permitted by LHD. If the Department of Agriculture and Consumer Services regulates the establishment, then they should also contacted. Determine if a joint investigation is needed or desired, and coordinate all follow-up.

12.00 Appendices

(Appendices A through S follow this page)

Types of Water Works Flow Chart



COMMONWEALTH of VIRGINIA
Department of Health
Division of Drinking Water
TRANSIENT NONCOMMUNITY SURVEY QUESTIONAIRE

System Name: _____ **County:** _____

New ☐ **Change of Owner** ☐ **Months Inactive** ☐ **LHD Transition** ☐

Owner _____ **Address** _____

Operator _____ **Address** _____

Type of Facility: **Restaurant** **Campground** **Grocery** **Motel**
(Circle One)

Other: _____ **Months per year open:** ____

Population: **Employees:** ____ **Customers:** ____

Total Served: ____

Will water be served to the public? (circle one) **YES / NO**

How will water be made available/served to the public: _____

Water Supply: **Number of sources:**

Source Type: **Well** **Drilled** **Bored** **Unknown**

Pump Type: **Submersible** **Turbine** **Jet**

Storage: **Hydropneumatic tank** **Bladder Tank**

Treatment: _____ **None:**

Well Lot: **(approx size)** _____ **Dedicated** **yes / no**

Known Contamination Sources within 50 ft of well? **yes / no**

List them: _____

Underground Storage Tanks Present: **yes / no**

Sewage Disposal: **Municipal** **Septic** **Package Plant**
(Circle One)

OTHER: _____

By signing below, I hereby declare the information noted above is true and accurate to the best of my knowledge. If any information changes, I will notify VDH-DDW within 24hrs of any change.

Signature of Owner: _____ **Date:** _____

Signature of DDW Rep: _____ **Date:** _____

TESTING WATER SUPPLY WELLS FOR YIELD AND DRAWDOWN

The *Waterworks Regulations* 12 VAC 5-590-840B6 requires that a well yield and drawdown test over a 48-hour minimum period be performed. For transient non-community waterworks, Part IV of the *Regulations* (12 VAC 5-590-1260B) allows a reduction in the 48 hour time period. Reduction of the 48hr may be granted to 24hr if the source is expected to have a low demand for use (i.e. 4 to 9 gpm). If the system demand is determined to be 3gpm or less, then a minimum pump test of at least 8 hours is required. These values, yield and drawdown, are critical to determining the reliable quantity of water available and to proper selection of a submersible well pump.

It is important to understand clearly the meaning of several terms related to the pump testing of water supply wells. These include:

Static Water Level - this is the level at which water stands in the well when no water is being withdrawn. This level is expressed as the distance from the ground surface to the water level in the well.

Pumping Level - this is the level at which water stands in the well when pumping is in progress. This is also referred to as the dynamic water level.

Maximum Drawdown - is the standing water level in the well at the stabilized pumping rate.

Stabilized Pumping Rate - Also referred to as reliable well yield is the well discharge at the point where the well pumping level remains constant at maximum drawdown.

Normally, the yield and drawdown test is performed after the well has been cased and grouted and in conjunction with well disinfection and quality testing. The pump test can be performed with a temporary well pump and generator set or after permanent power has been installed at the site. Prior to beginning the test, appurtenances must be provided to enable controlling (throttling) the well discharge, measuring the well discharge, and measuring the pumping water level. The well discharge can be controlled by a gate or butterfly valve installed on the discharge pipe. The well discharge can be measured by installing a water meter on the discharge pipe or by using a five gallon bucket and stopwatch (unless the expected yield is very high). Pumping water level can be measured by use of an air line arrangement (see figure 1) or by use of a string, float and measuring tape.

Once the above mentioned appurtenances are in place, the yield and drawdown test can be conducted. The general procedure is as follows:

1. Prior to beginning the pump test the well should be thoroughly disinfected in accordance with procedures outlined in **Appendix L**.

2. Measure and record the static water level prior to starting the well pump.

3. Start the well pump and begin to record the well discharge, the pumping water level, and the time. In the initial stages of the test these measurements should be taken at 10 to 15 minute intervals. Later the measurement intervals can increase to every 30 minutes and ultimately to one per hour.

4. As the test progresses, a pattern of well discharge versus pumping water level will emerge. Normally the pumping water level measurement will continue to fall. When this occurs the well discharge should be reduced by slightly closing the throttling valve. Continue to record the well discharge, pumping water level, and time.

5. If the pumping water level begins to rise you will need to slightly increase the well discharge by opening the throttling valve. Continue to record the well discharge, pumping water level, and time.

6. Your goal is the achieve a balance between the well discharge and pumping water level where both are constant and remain stable over time. Each well is different and this stabilized condition may be reached in a relatively short period of time or it may take many hours.

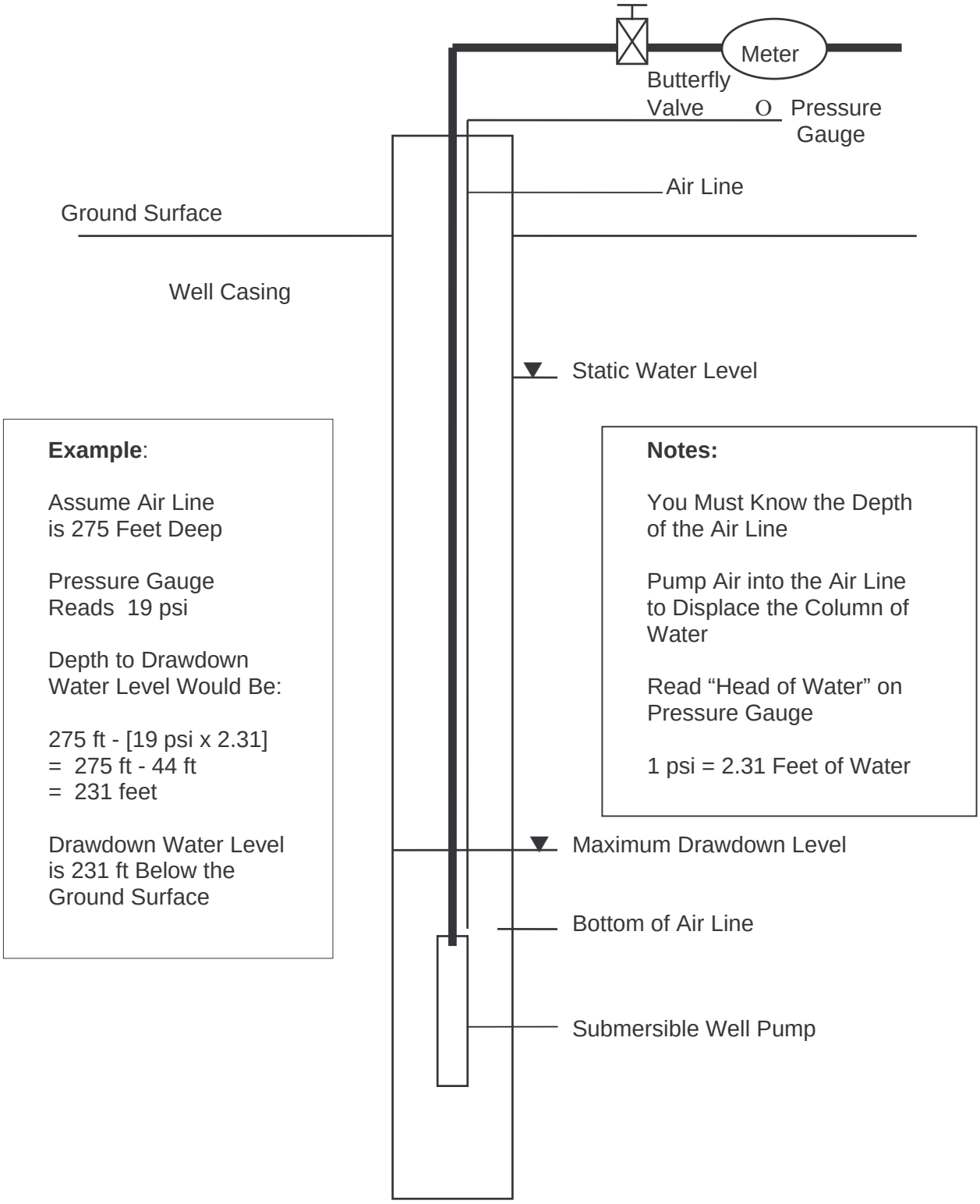
7. For the test to be valid the stabilized pumping rate must be achieved and the test must cover a duration of at least 48 hours (unless the Part IV exception is appropriate). The pumping rate and drawdown water level should remain stable for several hours.

8. At the end of the yield test it is recommended that several water level measurements be taken over some period of time after pumping is stopped. This is an indication of "recovery" or how quickly the drawdown water level returns to the initial static water level prior to beginning the test.

Realize that in many cases the capacity of the well pump may be the limiting factor. Assume that the reliable well yield of a well is 30 gpm but the pump used to perform the yield test is only capable of delivering 18 gpm. The results of the test will indicate a yield of 18 gpm but the well is actually capable of a greater yield. Be sure that the pump used to perform the yield test is at least capable of delivering the peak water demand.

Near the end of the yield and drawdown test water quality samples must be collected. The series of bacteriological samples should be collected one hour apart. A chemical sample for nitrate must be collected and it is recommended that additional samples be collected for metals and inorganics.

FIGURE 1 - WELL YIELD AND DRAWDOWN TESTING



Example:

Assume Air Line is 275 Feet Deep

Pressure Gauge Reads 19 psi

Depth to Drawdown Water Level Would Be:

275 ft - [19 psi x 2.31]
= 275 ft - 44 ft
= 231 feet

Drawdown Water Level is 231 ft Below the Ground Surface

Notes:

You Must Know the Depth of the Air Line

Pump Air into the Air Line to Displace the Column of Water

Read “Head of Water” on Pressure Gauge

1 psi = 2.31 Feet of Water

EXAMPLE WELL YIELD AND DRAWDOWN TEST

PUMP TEST DATA SHEET

PROJECT NAME Brookwood Subdivision DATE July 12, 1997
CONTRACTOR Blue Ridge Well & Pump Company COUNTY Rockbridge
WELL NUMBER Number 2 DURATION OF TEST 48 hrs
DEPTH OF WELL 305 feet DIAMETER OF WELL 6 in.
STATIC WATER LEVEL 32 feet DRAWDOWN WATER LEVEL 231 FT @ 58 GPM
WATER LEVEL RECOVERY 15 feet IN 5 MINUTES 120 feet IN 1 HOUR
LENGTH OF AIR LINE 275 FEET PUMP INTAKE DEPTH 280 feet
TYPE OF PUMP USED GOULDS MODEL 75H07 7½ hp

Time of Observation	Elapsed Time	GPM	Gauge PSI	Depth to Water	COMMENTS
07/12/97 1:00 PM	START	45	105 psi	32 feet	Dingy
1:10	10 min	45	105	32	"
1:20	20 min	45	104	34	"
1:30	30 min	45	104	34	"
1:40	40 min	45	104	34	"
1:50	50 min	45	104	34	"
2:00	1 hour	45	104	34	"
2:15	1.25 hr	50	102	39	Light Dingy
2:30	1.5 hr	50	100	44	"
2:45	1.75 hr	50	94	58	"
3:00	2 hour	50	93	60	"
3:30	2.5 hr	50	93	60	"
4:00	3 hour	50	92	62	"
5:00	4 hour	50	93	60	Cloudy
6:00	5 hour	55	91	65	"
7:00	6 hour	55	91	65	Clear
8:00	7 hour	55	92	62	"
9:00	8 hour	65	79	92	"
10:00	9 hour	65	64	127	"
11:00	10 hour	65	44	173	"
07/13/97 12:00	11 hour	65	29	208	"
01:00	12 hour	65	9	254	"
02:00	13 hour	58	14	242	"
03:00	14 hour	58	19	231	"
04:00	15 hour	58	19	231	"
05:00	16 hour	58	20	229	"
06:00	17 hour	58	20	229	"

PROJECT NAME Brookwood Subdivision PAGE 2

Time of Observation	Elapsed Time	GPM	Gauge PSI	Depth to Water	COMMENTS
07:00	18 hour	58	19 psi	231 feet	Clear
08:00	19 hour	58	19	231	"
09:00	20 hour	58	19	231	"
10:00	21 hour	58	19	231	"
1:00 PM	24 hour	58	19	231	"
3:00	26 hour	58	19	231	"
6:00	29 hour	58	19	231	"
9:00	32 hour	58	19	231	"
07/14/97 12:00	35 hour	58	19	231	"
3:00	38 hour	58	19	231	"
6:00	41 hour	58	19	231	"
10:00	45 hour	58	19	231	"
1:00 PM	48 hour	58	19	231	"

---------- STOP PUMPING START RECOVERY ----------

1:05 PM	5 min		26 psi	216 feet	
1:10	10 min		29	208	
1:20	20 min		39	185	
1:30	30 min		54	150	
1:40	40 min		58	141	
1:50	50 min		64	127	
2:00	1 hour		71	111	

PUMP TEST DATA SHEET

PROJECT NAME _____ DATE _____
CONTRACTOR _____ COUNTY _____
WELL NUMBER _____ DURATION OF TEST _____
DEPTH OF WELL _____ DIAMETER OF WELL _____
STATIC WATER LEVEL _____ DRAWDOWN WATER LEVEL ____FT @____ GPM
WATER LEVEL RECOVERY _____ IN 5 MINUTES _____ IN 1 HOUR
LENGTH OF AIR LINE _____ FEET PUMP INTAKE DEPTH _____ FEET
TYPE OF PUMP USED _____

Time of Observation	Elapsed Time	GPM	Gauge PSI	Depth to Water	COMMENTS

Transient Noncommunity Waterworks Design and Construction Checklist

Under provisions of the Code of Virginia, Title 54.1, Chapter 4, Section 54.1-402, and the Virginia Waterworks Regulations, information described by this checklist may be submitted by a waterworks owner in lieu of plans, specifications, documents, and designs prepared a licensed professional engineer. The following conditions apply:

- This procedure is only available to transient noncommunity waterworks serving no more than 100 persons total per day.
- Waterworks must be a direct delivery system without any treatment, meaning that system consists only of one source, small pressure storage tank, and single service connection.
- Single service connection consists of a structure with area less than 5,000 square feet.
- Construction of well must be by a well driller with Class A contractor license.
- Construction of remainder of waterworks must be by a master's level plumber or Class A contractor.

Owner Name _____
Owner Address _____
_____
Owner Occupation _____

I. Design Information (Fill in all blanks, check all boxes to indicate that item has been completed, and attach to this form copies of information as described.)

Waterworks Name _____
Type of Business _____
Total Number of Persons Served Per Day _____ Water uses _____
Days of operation _____ Hours of operation _____
[ ] Sketch of Facilities

I. Water quality:

[ ] Bacteriological results – series of 9 for MPN analysis (or series of 20 if any of first 9 are positive)

[ ] Chemical results – inorganic, metals, nitrate/nitrite, VOCs, SOCs (if required), and radiological

II. Construction Information (Fill in all blanks, check all boxes to indicate that item has been completed, and attach to this form copies of information as described.)

[ ] Water Well Completion Report – attach copy signed and dated by well driller that includes the following

- Well depth and hole size
- casing type, size, depth, weight/thickness
- screen length, depth, material, size
- grout type, depth

[ ] Well yield and drawdown test report – attach copy signed and dated by person conducting test that includes the following

- Test pump size and depth
- pumping rates and drawdown depths
- recovery data
- Well pump information model number and pump curve – attach copy of manufacturer's information

depth of pump _____ feet below ground level
Well drop pipe diameter (inches) _____ type of material _____
Well enclosure (attach sketch of enclosure or well head and remainder of waterworks)
enclosure details
dimensions _____
type of material _____
access hatch or door _____
freeze protection _____
concrete pad _____

[ ] pitless adapter and watertight cap –attach copy of manufacturer's information confirming certified status

Waterline (well to building – include in sketch with well enclosure)
diameter (inches) _____
type of material _____ (must be NSF approved for potable water)
describe pipe joints _____
describe trenching, bedding, and pipe installation procedures (attach separate sheet or describe below)
_____
_____
_____

Waterline Appurtenances (include in sketch with well enclosure and waterline)
[ ] check valve
[ ] gate valve
[ ] sampling tap
[ ] blowoff

Pressure tank (include in sketch with well enclosure and waterline)
[ ] attach copy of manufacturer's information that shows dimensions and features
[ ] pressure gauge
[ ] air relief (if needed according to manufacture)

System disinfection, flushing, and sampling (attach separate sheet or describe below)
_____
_____
_____

[ ] bacteriological sampling (2 negative samples on consecutive days after construction completed)

The information provided above, plus information on any attachments, is correct to the best of my knowledge.

Owner Signature _____

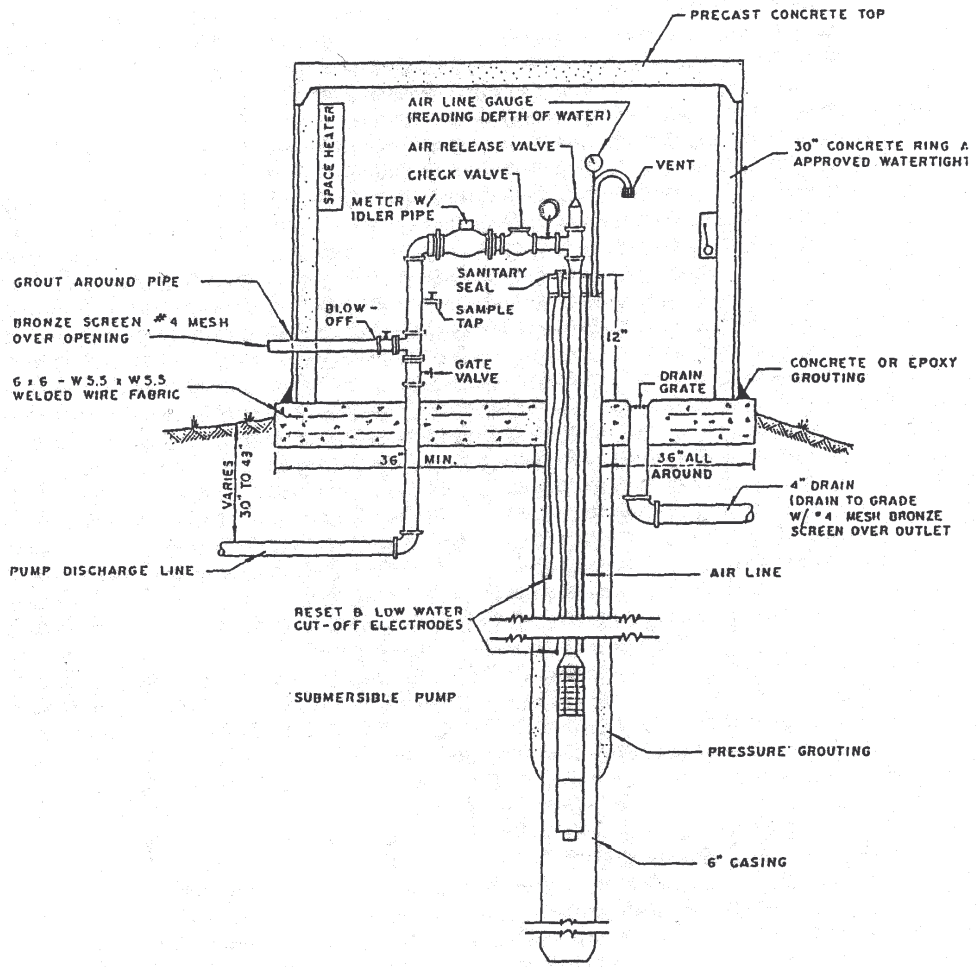
Date _____
****

III. Construction completion statement **(Owner must sign and date a second copy of this form completed in its entirety and submit it to VDH-DDW immediately following completion of construction.)** Construction of the waterworks was completed in substantial compliance with the design and construction information presented in parts I and II of this form.

Owner Signature _____
Date _____

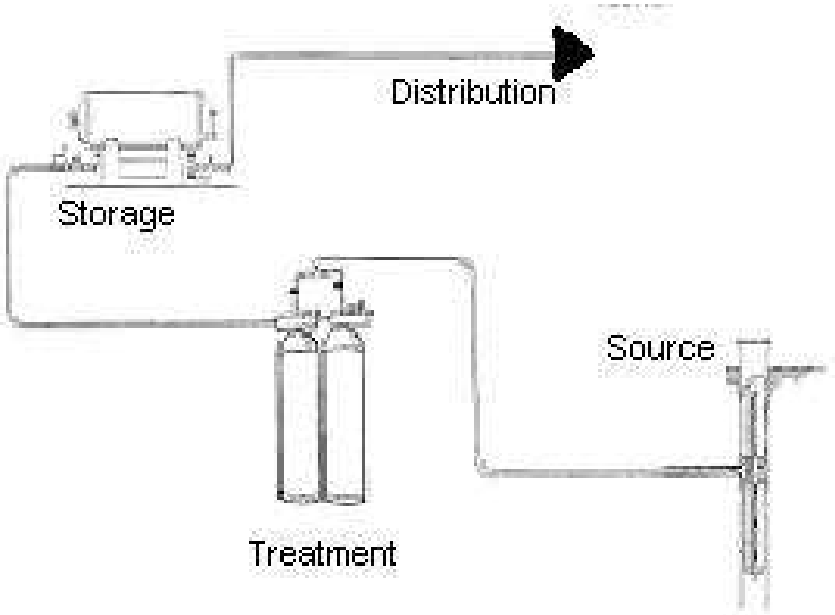
Example Sketch of Waterworks Facilities

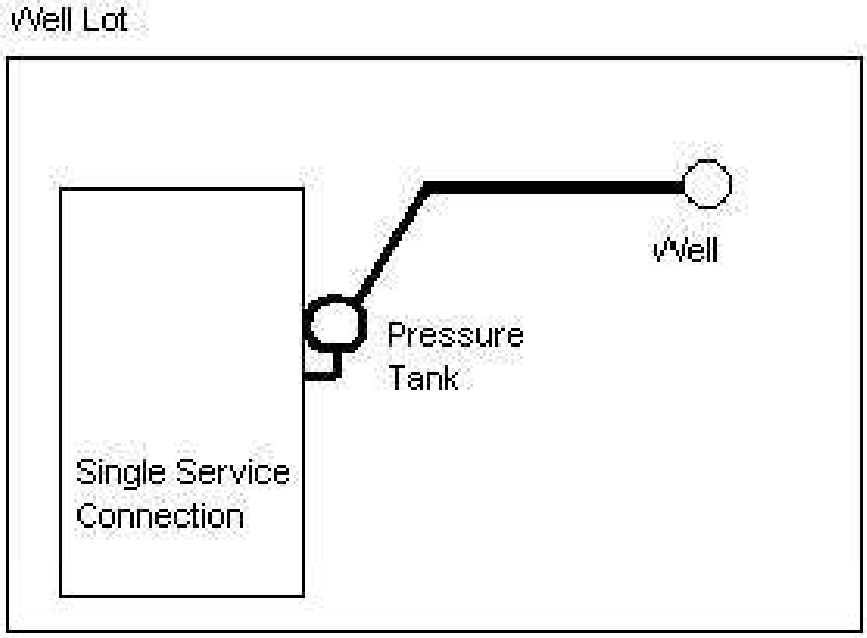
FIGURE 1 - WELL



STANDARD WELL DETAIL NO SCALE

Example Drawings: Reference PE Exception Policy





TNC Cross Connection Control Program

_____
(Name of Waterworks)

1. In order to minimize the possibility of a cross connection existing in our system, an initial inspection of all the facilities will be performed to locate and correct any cross connections identified.

2. Thereafter, routine inspections will be made annually to insure that no cross connections have developed. Areas of particular importance during the inspections are boiler make-up waterlines, custodial and laboratory sinks, and all hose bibs.

3. Records of the initial and routine follow-up inspections and any actions taken due to the inspections will be maintained at _____ for at least ten years.
(Location)

4. _____ will be placed in responsible charge of the
(Name of Responsible Person)
administration of this cross connection control program.

_____ _____
(Signature of Owner) (Date)

TRANSIENT NONCOMMUNITY WATERWORKS

MODEL PROGRAM

CROSS CONNECTION CONTROL

I. Purpose of the Program

Purpose of this program is to abate or control actual or potential cross connections and protect the public health. This program provides for establishment and enforcement of a program of cross connection control and backflow prevention in accordance with the Commonwealth of Virginia, State Board of Health, *Waterworks Regulations* 1995, or as amended. **THIS PROGRAM IS DIRECTED AT A WATERWORKS WHERE THE WATERWORKS OWNER AND PREMISES OWNER IS ONE AND THE SAME (OWNER).**

II. Authority for the Program

Commonwealth of Virginia, Department of Health
Waterworks Regulations, Part II, Article 3:
Cross Connection Control and Backflow Prevention in Waterworks

III. Administration of the Program

A. The owner shall administer and enforce the provisions of this program.

B. It shall be the duty of the owner to cause assessment to be made of the waterworks and premises where cross connection with the waterworks is deemed possible.

C. The responsibility to carry out the Program lies with **_____,** waterworks owner.

IV. Responsibilities of the Owner

Effective cross connection control and backflow prevention requires the cooperation of the owner, the local building official and the backflow prevention device tester.

A. The Program shall be carried out in accordance with the Commonwealth of Virginia, State Board of Health, *Waterworks Regulations* and shall provide containment or isolation of potential contaminants.

B. The owner has full responsibility for water quality and for the construction, maintenance and operation of the waterworks beginning at the water source and ending at the free flowing outlet.

C. The owner shall, to the extent of his/her jurisdiction, provide continuing identification and evaluation of all cross connection hazards. This shall include an assessment of the water supply system for cross connections to be followed by the installation of a backflow prevention device or separation if necessary. Assessments shall be performed at least annually.

D. In the event of the backflow of pollution or contamination into the waterworks, the owner shall promptly take or cause corrective action to confine and eliminate the pollution or contamination. The owner shall report to the appropriate Commonwealth of Virginia, Department of Health, Division of Drinking Water Field Office in the most expeditious manner (usually by telephone) when backflow occurs and shall submit a written report by the 10th day of the month following the month during which backflow occurred addressing the incident, its causes, effects, and preventative or control measures required or taken.

E. The owner shall take positive action to ensure that the waterworks is adequately protected from cross connections and backflow at all times. If a cross connection exists or backflow occurs or if the consumer's water supply system causes the pressure in the waterworks to be lowered below 10 psi gauge, the owner may discontinue the water service and water service shall not be restored until the deficiencies have been corrected or eliminated to the satisfaction of the Commonwealth of Virginia, Department of Health, Division of Drinking Water Field Office.

F. In order to protect the occupants of the premises, any cross connection beyond the service connection should be eliminated by application of an appropriate backflow prevention device or separation. Appropriate backflow prevention device or separation should be applied at each point-of-use and/or applied to the water supply system, isolating an area which may be a health or pollutional hazard to the water supply system or to the waterworks.

G. Records of backflow prevention devices, separations, and the water supply system, including inspection records, records of backflow incidents, and records of device tests shall be maintained for ten years.

V. Type of Protection Required

The type of protection required shall depend on the degree of hazard which exists or may exist.

The degree of hazard, either high, moderate, or low, is based on the nature of the contaminant; the potential health hazard; the probability of the backflow occurrence; the method of backflow either by backpressure or by backsiphonage; and the potential effect on waterworks structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of pure water.

Table 1 shall be used as a guide to determine the degree of hazard for any situation.

A. An air gap or physical disconnection gives the highest degree of protection and shall be used whenever practical to do so in high hazard situations subject to backpressure.

B. An air gap, physical disconnection and a reduced pressure principle backflow prevention device will protect against backpressure when operating properly.

C. Pressure vacuum breakers will not protect against backpressure, but will protect against backsiphonage when operating properly. Pressure vacuum breakers may be used in low, moderate or high hazard situations subject to backsiphonage only.

D. A double gate - double check valve assembly shall not be used in high hazard situations.

E. Barometric loops are not acceptable.

F. Interchangeable connections or change-over devices are not acceptable.

VI. Backflow Prevention Devices and Backflow Prevention by Separation

A. Backflow prevention devices for containment include the reduced pressure principle backflow prevention assembly, the double gate - double check valve assembly, and the pressure vacuum breaker assembly.

B. Backflow prevention by separation shall be an air gap or physical disconnection. The minimum air gap shall be twice the effective opening of a potable water outlet unless the outlet is a distance less than three times the effective opening away from a wall or similar vertical surface, in which case the minimum air gap shall be three times the effective opening of the outlet. In no case shall the minimum air gap be less than one inch.

C. Backflow prevention devices shall be of the approved type and shall comply with the most recent American Water Works Association Standards and shall be approved for containment by the University of Southern California, Foundation for Cross-Connection Control and Hydraulic Research.

D. Backflow prevention devices shall be installed in a manner approved by the owner and in accordance with the University of Southern California, Foundation for Cross-Connection Control and Hydraulic Research recommendations and the manufacturer's installation instructions. Vertical or horizontal positioning shall be as approved by the University of Southern California, Foundation for Cross-Connection Control and Hydraulic Research.

E. Point-of-use isolation devices shall bear an appropriate American Society of Sanitary Engineering Standard Number.

F. Backflow prevention devices with openings, outlets, or vents that are designed to operate or open during backflow prevention shall not be installed in pits or areas subject to flooding.

VII. Preventative and Control Measures

A. General

1. All potable water openings or outlets shall be protected against backflow where a health, pollutional, or system hazard to the waterworks exists or may exist.

2. The required method of protection provided shall be the method which best provides protection of health, pollution, or system hazards.

3. The required device or separation shall be installed or constructed in accordance with the Uniform Statewide Building Code, the Commonwealth of Virginia State Board of Health *Waterworks Regulations*, manufacturers' recommendations and the University of Southern California, Foundation for Cross-Connection Control and Hydraulic Research (USC) as appropriate.

B. A backflow prevention device shall be installed where the plumbing fixture connects to the premises water supply system or the waterworks, as appropriate, where the following conditions exist:

1. A backflow prevention device shall be installed at fire protection system connections to the premises' water supply system or to the waterworks. The protection shall be by a reduced pressure principle backflow preventer, ASSE No. 1013.

2. Where fire protection systems are constructed of piping, joints and connections approved for water distribution systems (NSF pw) a backflow prevention device shall not be required if the premises'

water supply system design provides freely flowing potable water through the fire protection system and the potable water is not allowed to stagnate or deteriorate in water quality; otherwise, protection shall be by a reduced pressure principle backflow preventer, ASSE #1013.

3. Premises having booster pumps connected to the waterworks or water system shall be equipped with a low pressure regulating or cutoff device to shut off the booster pump when the suction pressure drops to a minimum pressure as determined by hydraulic analysis and approved by the Division of Drinking Water, not to be less than 10 psi gauge.

4. At the connection to boiler systems where conditioning chemicals are or can be used, a reduced pressure principle backflow preventer (RPZ) shall be used, ASSE No. 1013 or an air gap shall be used.

5. At the connection of irrigation systems under the following conditions:

   a. Where shutoff valves or metering pumps are not located down stream of the backflow prevention device, an atmospheric vacuum breaker, ASSE No. 1001, shall be installed and located at least 12 inches above the highest outlet or flood elevation but no more than 30 inches above the ground.

   b. Where shutoff valves are located downstream of the backflow prevention device and metering pumps are not used, a pressure type vacuum breaker, ASSE No. 1020, shall be installed and located at least 6 inches above the highest outlet or flood elevation but not more than 30 inches above the ground.

   C. Where metering pumps are used in the irrigation system to dispense fertilizer or other chemicals, an RPZ, ASSE No. 1013, shall be installed above ground, not in a pit or area subject to flooding.

6. Existing premises with an auxiliary water system may maintain the auxiliary system on the premises by use of backflow prevention by physical disconnection from the auxiliary water system.

7. The type of backflow prevention device listed below with corresponding ASSE Standard number shall be installed at each of the following locations:

   a. threaded hose bibbs, hose bibb vacuum breaker 1011 or frostproof automatic draining wall hydrants 1019

   b. laboratory faucets where hoses can be attached, vacuum breaker 1035

   c. shampoo sinks, pressure type vacuum breaker 1020

   d. sinks, vats, tanks, or other receptacles, air gap (See definitions)

   e. swimming pool, hot tub, sauna, RPZ 1013

   f. washing machines where water supply valve is located ahead of backflow prevention device, atmospheric vacuum breaker 1001

   g. washing machines where water supply valve is located below backflow prevention device, pressure type vacuum breaker 1020

   h. garbage can washer, pressure type vacuum breaker 1020

   i. carbonated beverage dispensers post mix RPZ 1013

j. food handling equipment

k. liquid vending machines

l. **Add additional locations consistent with the waterworks and the facilities served. Locations listed above which do not apply may be deleted.**

m.

n.

VIII. Maintenance and Inspection Requirements

A. It shall be the responsibility of the owner to maintain all backflow prevention devices or separations in good working order and to make no piping or other arrangements for the purpose of bypassing or defeating backflow prevention devices or separations.

B. Operational testing and inspection schedules shall be established by the owner. The interval between testing and inspection of each device shall be established in accordance with the age and condition of the device and the device manufacturer's recommendations. Backflow prevention device and separation inspection and testing intervals shall not exceed 1 year.

C. Backflow prevention device overhaul procedures and replacement parts shall be in accordance with the manufacturer's recommendations.

D. Backflow prevention device testing procedures shall be in accordance with the University of Southern California, Foundation for Cross-Connection Control and Hydraulic Research, Backflow Prevention Assembly Field Test Procedure and the manufacturer's instructions.

IX. Backflow Prevention Device Testers

1. Device testers will have obtained a certificate of completion of a course recognized by the American Water works Association, the Virginia Department of Health or the Virginia Cross Connection Control Association for cross connection control and backflow prevention inspection, maintenance and testing or otherwise be certified by a Commonwealth of Virginia tradesman certification program.

2. The tester is responsible for making competent inspections and for repairing or overhauling backflow prevention devices and making reports of such repair to the consumer’s water supply system owner on forms approved by the Division of Drinking Water.

3. The tester shall include the list of materials or replacement parts used and insure that parts used in the repair of the backflow prevention device meet the manufacturer’s recommendations and the University of Southern California, Foundation for Cross Connection Control and Hydraulic Research (USC).

4. The tester shall not change the design or operational characteristics of a device during repair or maintenance without prior written approval of the waterworks owner and the Division of Drinking Water.

5. The tester shall be equipped with and be competent in the use of all the necessary tools gauges, manometers and other equipment necessary to properly test, repair and maintain backflow prevention devices.

X. Records

A. An up-to-date listing of waterworks and water supply system locations where cross connection control devices (including pressure sensing devices) or separations (including separations from auxiliary or nonpotable water systems and air gaps) are installed shall be maintained by the owner. The list will contain:

- location of backflow prevention device, pressure sensing device or separation
- manufacturer of device
- device model number
- device serial number
- device size
- ASSE number
- device testing frequency (annually) (semiannually) (quarterly)
- pressure sensing device pressure set point

B. Cross connection control device or separation inspection reports shall be maintained by the owner for ten years. The report will contain:

- information as noted in A above
- an assessment of:
  - degree of hazard
  - appropriateness of device or separation
  - installation
  - general appearance
  - repair/replacement actions
  - new/additional device installations

C. Cross connection control device testing reports shall be maintained by the owner for ten years. The report will contain:

- information as noted in A above
- line pressure
- results of testing
- test method used
- date and signature of device tester

If repairs were made, the test report will contain:

- which parts replaced
- probable cause of test failure
- preventative measures taken

XI. Thermal Expansion

Normally, as water is heated and expands it would back up in the service line into the main if no usage was occurring. Installation of backflow prevention devices or certain plumbing appurtenances (pressure reducing valves) at the service connection or within the consumer's water supply system prevent thermally expanded water from flowing from the premises into the distribution system. When the water heater is operating, water is expanding and pressure is increasing, thermal expansion in a closed plumbing system under no flow conditions may cause the emergency temperature and pressure relief valve to open and close frequently and may reduce the life of plumbing fixtures and piping.

The temperature and pressure (T & P) relief valve is an emergency relief valve, not an operating control valve. If the T & P relief valve is used frequently, it's useful life will be shortened and it could cease to function.

Thermal expansion can cause damaging stress and strain to water heaters, solenoid valves, O-rings, float valves, pump seals, and plumbing fixtures or fittings.

Generally, 80 psi for a short period of time is the maximum pressure under no flow conditions most fixtures, appliances or appurtenances should be subjected to.

Where thermal expansion is a problem the following devices could be installed:

1. a bladder or diaphragm type expansion tank;

2. an auxiliary pressure relief valve;

3. an anti-siphon ball cock with auxiliary relief valve into the toilet tank set at no more than 80 psi.

Installation should be in strict accordance with the manufacturer's instructions, the Uniform Statewide Building Code and the National Sanitation Foundation.

Customers will be advised of the potential for thermal expansion prior to or during installation of a backflow prevention device. Solutions to thermal expansion will be at the discretion of the consumer's water supply system owner and at the expense of the consumer's water supply system owner.

V. Definitions

Air Gap — means the unobstructed vertical distance through the free atmosphere between the lowest point of the potable water outlet and the rim of the receiving vessel.

Auxiliary Water System — means any water system on or available to the premises other than the waterworks. These auxiliary waters may include water from a source such as wells, lakes, or streams; or process fluids; or used water. They may be polluted or contaminated or objectionable, or constitute an unapproved water source or system over which the water purveyor does not have control.

Backflow — means the flow of water or other liquids, mixtures, or substances into a waterworks from any source or sources other than its intended source.

Backflow Prevention by Separation ("Separation") — means preventing backflow by either an air gap or by physical disconnection of a waterworks by the removal or absence of pipes, fittings, or fixtures that connect a waterworks directly or indirectly to a nonpotable system or one of questionable quality.

Backflow Prevention Device ("Device") — means any approved device intended to prevent backflow into a waterworks.

Backpressure Backflow — means backflow caused by pressure in the downstream piping which is superior to the supply pressure at the point of consideration.

Backsiphonage Backflow — means backflow caused by a reduction in pressure which causes a partial vacuum creating a siphon effect.

Consumer — means person who drinks water from a waterworks.

Consumer's Water Supply System ("Water Supply System") — means the water service pipe, water distributing pipes, and necessary connecting pipes, fittings, control valves, and all appurtenances in or adjacent to the building or premises.

Containment — means the prevention of backflow into a waterworks from a consumer's water supply system by a backflow prevention device or by backflow prevention by separation at the service connection.

Contaminant — means any objectionable or hazardous physical, chemical, biological, or radiological substance or matter in water.

Cross Connection — means any connection or structural arrangement, direct or indirect, to the waterworks whereby backflow can occur.

Degree of Hazard — means either a high, moderate or low hazard based on the nature of the contaminant; the potential health hazard; the probability of the backflow occurrence; the method of backflow either by backpressure or by backsiphonage; and the potential effect on waterworks structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of pure water.

Distribution Main — means a water main whose primary purpose is to provide treated water to service connections.

Division — means the Commonwealth of Virginia, Virginia Department of Health, Division of Drinking Water, Division of Water Supply Engineering.

Domestic Use or Usage — means normal family or household use, including drinking, laundering, bathing, cooking, heating, cleaning and flushing toilets (see **Appendix A** of the Regulations for Title 32.1, Article 2, *Code of Virginia*, 1950, as amended).

Double Gate-Double Check Valve Assembly — means an approved assembly designed to prevent backsiphonage or backpressure backflow and used for moderate or low hazard situations, composed of two independently operating, spring-loaded check valves, tightly closing shutoff valves located at each end of the assembly and fitted with properly located test cocks.

Entry Point — means the place where water from the source is delivered to the distribution system.

Health Hazard — means any condition, device, or practice in a waterworks or its operation that creates, or may create, a danger to the health and well being of the water consumer.
Isolation — means the prevention of backflow into a waterworks from a consumer's water supply system by a backflow prevention device or by backflow prevention by separation at the sources of potential contamination in the consumer's water supply system. This is also called point-of-use isolation. Isolation of an area or zone within a consumer's water supply system confines the potential source of contamination to a specific area or zone. This is called area or zone isolation.

Maximum Contaminant Level — means the maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of a waterworks, except in the cases of turbidity and VOCs, where the maximum permissible level is measured at each entry point to the distribution system. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded from this definition. Maximum contaminant levels may be either "primary" (PMCL) meaning based on health considerations or "secondary" (SMCL) meaning based on aesthetic considerations.

Plumbing Fixture — means a receptacle or device which is either permanently or temporarily connected to the water distribution system of the premises, and demands a supply of water therefrom; or discharges used water, waste materials, or sewage either directly or indirectly to the drainage system of the premises; or requires both a water supply connection and a discharge to the drainage system of the premises.

Pollution — means the presence of any foreign substance (chemical, physical, radiological, or biological) in water that tends to degrade its quality so as to constitute an unnecessary risk or impair the usefulness of the water.

Pollution Hazard — means a condition through which an aesthetically objectionable or degrading material may enter the waterworks or a consumer's water system.

Premises — means a piece of real estate; house or building and its land.

Pressure Vacuum Breaker — means an approved assembly designed to prevent backsiphonage backflow and used for high, moderate, or low hazard situations, composed of one or two independently operating, spring-loaded check valves; an independently operating, spring-loaded air-inlet valve; tightly closing shutoff valves located at each end of the assembly; and fitted with properly located test cocks.

Process Fluids — means any kind of fluid or solution which may be chemically, biologically, or otherwise contaminated or polluted which would constitute a health, pollutional, or system hazard if introduced into the waterworks. This includes, but is not limited to:

1. Polluted or contaminated water,

2. Process waters,

3. Used water, originating from the waterworks which may have deteriorated in sanitary quality.

4. Cooling waters,

5. Contaminated natural waters taken from wells, lakes, streams, or irrigation systems,

6. Chemicals in solution or suspension, and

7. Oils, gases, acids, alkalis, and other liquid and gaseous fluid used in industrial or other processes, or for fire fighting purposes.

Pure Water or Potable Water — means water fit for human consumption and domestic use which is sanitary and normally free of minerals, organic substances, and toxic agents in excess of reasonable amounts for domestic usage in the area served and normally adequate in quantity and quality for the minimum health requirements of the persons served (see **Appendix A** of the Regulations for Title 32.1, Article 2, *Code of Virginia*, 1950, as amended).

Reduced Pressure Principle Backflow Prevention Device (RPZ device) — means an approved assembly designed to prevent backsiphonage or backpressure backflow used for high, moderate, or low hazard situations, composed of a minimum of two independently operating, spring-loaded check valves together with an independent, hydraulically operating pressure differential relief valve located between the two check valves. During normal flow and at the cessation of normal flow, the pressure between these two checks shall be less than the supply pressure. The unit must include tightly closing shutoff valves located at each end of the assembly and be fitted with properly located test cocks.

Service Connection — means the point of delivery of water to a customer's building service line as follows:

1. If a meter is installed, the service connection is the downstream side of the meter;

2. If a meter is not installed, the service connection is the point of connection to the waterworks;

3. When the water purveyor is also the building owner, the service connection is the entry point to the building.

System Hazard — means a condition posing a threat of or actually causing damage to the physical properties of the waterworks or a consumer's water supply system.

Used Water — means water supplied from the waterworks to a consumer's water supply system after it has passed through the service connection.

Water Supply — means the water that shall have been taken into a waterworks from all wells, streams, springs, lakes, and other bodies of surface water (natural or impounded), and the tributaries thereto, and all impounded groundwater, but the term "water supply" shall not include any waters above the point of intake of such waterworks (see **Appendix A** of the Regulations for Title 32.1, Article 2, *Code of Virginia*, 1950, as amended).

Waterworks — means a system that serves piped water for drinking or domestic use to (1) the public, (2) at least 15 connections, or (3) at least 25 individuals for at least 60 days out of the year. The term "waterworks" shall include all structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of pure water except the piping and fixtures inside the building where such water is delivered (see Title 32.1, Article 2, *Code of Virginia*, 1950, as amended).

Waterworks Owner — means an individual, group of individuals, partnership, firm, association, institution, corporation, government entity, or the Federal Government which supplies or proposes to supply water to any person within this State from or by means of any waterworks (see Title 32.1, Article 2, *Code of Virginia*, 1950, as amended).

TABLE 1 — DETERMINATION OF DEGREE OF HAZARD

Premises with one or more of the following conditions shall be rated at the corresponding degree of hazard.

High Hazard	- The contaminant is toxic, poisonous, noxious or unhealthy.
	- In the event of backflow of the contaminant, a health hazard would exist.
	- A high probability exists of a backflow occurrence either by backpressure or by backsiphonage.
	- The contaminant would disrupt the service of piped water for drinking or domestic use.
	- Examples — Sewage, used water, nonpotable water, auxiliary water systems and toxic or hazardous chemicals.
Moderate Hazard	- The contaminant would only degrade the quality of the water aesthetically or impair the usefulness of the water.
	- In the event of backflow of the contaminant, a health hazard would not exist.
	- A moderate probability exists of a backflow occurrence either by backpressure or by backsiphonage.
	- The contaminant would not seriously disrupt service of piped water for drinking or domestic use.
	- Examples — Food stuff, nontoxic chemicals and nonhazardous chemicals.
Low Hazard	- The contaminant would only degrade the quality of the water aesthetically.
	- In the event of backflow of the contaminant, a health hazard would not exist.
	- A low probability exists of the occurrence of backflow.
	- Backflow would only occur by backsiphonage.
	- The contaminant would not disrupt service of piped water.
	- Examples — Food stuff, nontoxic chemicals and nonhazardous chemicals.

Isolation Device Application

Degree of hazard	Method of backflow	Pressure or flow conditions	Device	ASSE #
High	BP or BS	Continuous	RPZ	1013 & 1047
	BS only	Noncontinuous	Pipe applied AVB	1001 & 1035
		Noncontinuous	Hose bibb AVB	1011 & 1052
		Noncontinuous	Wall Hydrant w/AVB	1019
		Continuous	PVB	1020 & 1056
Moderate	BP or BS	Continuous	DG-DC	1015 & 1048
Low	BS only		Dual Check:	
		Continuous	w/o vent	1024 & 1032
		Continuous	w/vent	1012

NOTES:

- Degree of Hazard - See *Table 2.10 — Determination of Degree of Hazard* in the *Waterworks Regulations*.
- BS means backflow by backsiphonage.
- BP means backflow by backpressure or superior pressure.
- Continuous means operating under continuous flow or pressure. This condition usually applies to devices installed inline and may have valves downstream of the device.
- Noncontinuous means operating intermittently not to exceed 12 hours under continuous pressure or flow in a 24-hour period. This condition usually applies to devices which are connected to hose bibbs, hydrants, or faucets which are open to the atmosphere. Valves should not be located downstream of the device.
- RPZ means a reduced pressure principal backflow prevention assembly.
- Pipe applied AVB means an atmospheric vacuum breaker permanently installed in the plumbing or on faucets.
- Hose bibb AVB means a hose bibb type atmospheric vacuum breaker with a single or with dual checks and a vent.
- Wall hydrant w/AVB means a through-the-wall, frostproof self-draining type wall hydrant with AVB attached or built in.
- PVB means a pressure vacuum breaker.
- Spill resistant AVB have the same ASSE # as standard, pipe applied AVB.
- Spill resistant PVB have ASSE # 1056.
- DG-DC means a double gate-double check valve assembly.
- Dual Check without a vent means a device composed of two independently acting check valves ("residential dual check" and "beverage dispenser dual check").
- Double check with a vent means a device composed of two independently acting check valves with an intermediate atmospheric vent ("boiler dual check").

INFORMATION:

- Yard hydrants which are frostproof and drain the water in the barrel through an underground weephole are subject to contamination and are prohibited.
- Some wall hydrants will not drain if the hose is left connected.

SUGGESTED CROSS CONNECTION CONTROL SURVEY FOCUS

a. Unapproved auxiliary source on premises (whether connected or not)

b. Boiler w/actual or potential chemical addition

c. Vats, tanks, vessels for holding non-potable water, process liquids, etc.

d. Connections to sewers, drains, sewage pumps, or ejectors

e. Swimming pools, ornamental fountains, ponds, recirculating systems

f. Lawn sprinkler/irrigation system

g. Sinks other than kitchen and bathroom (e.g. lab, janitor, laundry tub)

h. Fire sprinkler system using non-potable water pipe, heads subject to flooding, chemicals

i. Cooling tower/system, heat exchange system

j. Water booster pump

k. Threaded hose bibs and yard hydrants

l. Specialty equipment (kitchen, laundry, lab, medical, point of use water treatment, etc.)

TNC INITIAL SANITARY SURVEY PROCEDURE
(Recommended)

I. **Meet with owner and local EHS (when possible)**

- Provide copy of information packet
- Explain TNC transition from LHD to DDW
- Explain federal and state drinking water regulations and refer owner to packet
- Summarize DDW's role as provider of technical assistance (emphasize this part) and enforcer of Waterworks Regulations
- Summarize significant information found (or not found) in file and ask owner if he has additional information
  - well construction data (very important)
  - well pump capacity
  - well driller/pump installer name
  - water quality data – bacti and chemical
  - sketch/plans of water system, distribution system
- Discuss/summarize/explain owner's responsibilities
  - Monitoring (BSSP, bacti, nitrate, routines, repeats, replacements, confirmation samples)
  - State lab procedures vs. private lab, including fees
  - General operation and maintenance of waterworks (including CC/BF program)
  - Licensed operator (if Class IV or higher waterworks)
  - Reporting to state (not required if no treatment and under 10,000 gpd usage)
  - Operation permit
- Gather basic administrative information and information needed to determine existing usage/design capacity
  - Correct legal owner name and address (very important for permit issuance). Ask to see a copy of an official document containing owner's name.
  - Administrative contact name and address
  - Sampler name and address
  - Operator name and address
  - Water treatment specialist or service/maintenance contractor name and address
  - Existing users, number of staff, number of visitors, number of rooms, hours of operation, etc. (very important for establishing permit capacity)
  - Other permits that contain design capacity/limitations

II. **Inspect well and remainder of waterworks and gather physical data to complete an Engineering Description Sheet (EDS)**

- Well location
- Well head and enclosure
- Well lot/area
- Storage tank
- Treatment and pumping facilities
- Sampling sites for bactis
- Cross connections
- Distribution system

III. **End of survey meeting with owner**

- Discuss findings/deficiencies
- Complete bacti sample siting report
- identify specific sample location(s)
- inform owner of how many routine samples required (monthly for 6-12 months if no bacteriological history exists)
- ask owner to sign all necessary forms (i.e. BSSP, CC/BF, etc)

IV. **Provide technical assistance/information to owner as promised within 7-10 days unless it can wait to be sent with sanitary survey report**

V. **Prepare cover letter, sanitary survey report, and other relevant information**

- Cover letter
  - list several of the most significant items
  - address bacti monitoring requirement
  - indicate approval of BSSR and CCCP (if appropriate)
  - encourage owner to comply and to reply to comments
  - offer technical assistance
- Report
  - address deficiencies by priority listing
  - briefly explain problems and solutions
  - address requirement/procedure for nitrate sampling
  - address cross connection control program requirement
  - attach relevant information
  - submit report to supervisor for review

VI. Send report to owner within 30 days after inspection

VII. Provide required information in SDWIS/R&R immediately to establish routine monitoring schedule, legal entities, etc.

XII. Prepare operation permit and EDS and send to owner within 60 days

Example deficiencies considered to have an immediate or direct impact on public health

Deficiencies related to Surface Water sources:
Filtration Requirements not met (as in Turbidity and CT)

Finished water storage:
Tank not watertight
Tank location unknown
Tank buried and not able to inspect

Well Construction Deficiencies:
Sanitary Seal and casing not watertight
No screened vent
Unknown source location

Distribution System:
Cross-connection
- Lawn sprinkler or irrigation systems
- Unapproved auxiliary sources
- Boilers with no backflow prevention installed

Spring sources:
Springbox insufficient to protect source
No screen on overflow
Prone to direct surface contamination

Disinfection deficiencies:
Non-functioning equipment (if Required
Chemical usage/dosage unknown
Non-NSF or GRAS approved chemicals used

Monitoring Compliance:
Monitoring not current
MCL violations

Management deficiencies:
No reports submitted (when req)
No licensed Op (when required)

General:
Chemical storage poses safety and health hazards to staff and the public
Toxic chemicals stored at or near source/storage
Cross-connection in treatment process

Waterworks Revocation Letter to Owner

SUBJECT:
Water –

(Date)

Waterworks Owner
Address 1
Address 2
City, State, Zip Code

Dear (*Waterworks Owner)*

You are hereby notified that it is our intent to revoke the Virginia Department of Health Operation Permit Number _____ issued to _____ covering the operation of the waterworks at IU(*service area name)* in *(City/County name)*, Virginia. Revocation is in accordance with the provisions of Title 32.1, Chapter 6, Article 2, Section 32.1-174, Code of Virginia, as amended. This permit is being revoked due to (the change of ownership from *(previous legal owner name)* to *(new legal owner name)* (there being less than 15 connections and less than 25 people served by this waterworks.)

If you have no objection to revocation of this permit, please sign within 10 days the statement at the bottom of the letter copy, which is enclosed, and return it to this office. If we can be of any further assistance, please contact me at *(phone number)*.

Sincerely,

Engineering Field Director

This is to advise that I have no objection to the revocation of Waterworks Operation Permit No. _____, issued *(date)* **for** *(Waterworks name)* **located in** *(City/County name)*.

_____
(*Name and title)*

CC: _____ County Health Department
_____ County Administrator
VD – DDW, Central

PERMIT REVOCATION LETTER

SUBJECT:
Water –

(Date)

Waterworks Owner
Address 1
Address 2
City, State, Zip Code

Dear (*Waterworks Owner)*

In accordance with the provisions of Title 32.1, Section 32.1-174 of the 1950 Code of Virginia, as amended, you are hereby notified of the revocation of Virginia Department of Health Permit Number _____ issued on _____ covering the operation of the waterworks at *(service area name)* in *(County name or City)*, Virginia. This permit is being revoked due to (the change of ownership from *(previous legal owner name)* to *(new legal owner name)* (there being less than 15 connections and less than 25 people served by this waterworks.) Revocation is to become effective upon receipt of this letter.

By direction of the State Health Commissioner.

Sincerely,

Director, Division of Drinking Water

cc: _____ County Health Department
_____ County Administrator
VDH – DDW, Central

Waterworks Operation Permit Revocation

TO: Division of Drinking Water

FROM: *
Engineering Field Director

SUBJECT: * County
Water: *

DATE:

A waterworks operation permit revocation letter for signature in the Central Office is attached.

We notified the owner by certified and regular mail of our intent to revoke the permit and advised him that he had 10 days to voice objections or request a hearing. The owner's response was as follows:

[ ] Signed certified mail receipt returned to us, but owner did not respond to our notification.

[ ] Signed certified mail receipt returned to us, and owner responded in separate correspondence that he had no objections and did not want a hearing (copy attached).

[ ] Certified letter sent to last known address was returned as undeliverable.

Disinfecting a Well

1. Calculate the amount of chlorine needed to attain a free chlorine concentration of at least 100 mg/L. Use the table below which is based on well diameter.

2. If your well is more than 200-300 feet, or if you employ a deep well turbine pump, it is best to use powdered HTH or HTH tablets that have been crushed. A whole tablet will take considerably longer to dissolve than this procedure should take to complete.

3. While the cap is off, connect a hose to the nearest hose bib and run water back down the hole until you get a strong chlorine smell from the hose.[1] Now squirt the inside of the well casing until you can't stand it any more. The intent is to rinse down any growth above the waterline which otherwise won't come in contact with the disinfecting agent. This also serves to agitate the water column and mix the chlorine thoroughly. If you do not have a pitless adapter, this task can be more difficult and the procedures may need to be amended.

4. Now you are ready to replace the cap and disinfect the system by running water at interior taps until the chlorine is sensed. This needs to be done at both hot water and cold water taps. When chlorine has been detected at all interior taps, shut off the water and let sit for a reasonable period of time. At least 1/2 hour is desired.

5. You are now ready to flush the system at will. The chlorine may come out quickly as a concentrated slug or it may take a long period at lower levels of concentration depending upon the characteristics of the well and the pump depth. This portion of the procedure is unpredictable. It is not necessary to flush the system until all traces of chlorine are gone. Water is ready for potable use when you can stand to smell it and drink it. When flushing, be sure to consider the safe well yield and your septic system's ability to buffer this disinfection. It may be best to flush the system to open ground or to a drainage ditch.

   Chlorine required to dose 100 feet of water column at 100 mg/L

Casing Diameter	HTH or Perchloron	Purex or Clorox (5.25%)
6	4 ounces	40 ounces
8	6 ounces	4 pints
10	8 ounces	7 pints
12	12 ounces	10 pints

[1] This will not draw the well down since you are returning all water to the well. You can safely let this run for several hours without any adverse effects.

BACTERIOLOGICAL SERIES GEOMETRIC MEAN CALCULATIONS

Assume that you have received a series of 20 Most Probable Number (MPN) bacteriological sample results for a new well. The *Waterworks Regulations* 12 VAC 5-590-840A states that groundwaters containing coliform concentrations less than 100 and more than 3 organisms per 100 milliliters based upon the geometric mean of 20 or more samples shall be disinfected. Therefore, you have to calculate the geometric mean of the 20 samples and determine if chlorination is required for this proposed well source.

Sample Number	MPN Result	LOG Value	Sample Number	MPN Result	LOG Value
1	<2.2	0	11	13	1.114
2	3	0.477	12	<2.2	0
3	330	2.518	13	330	2.518
4	<2.2	0	14	<2.2	0
5	<2.2	0	15	<2.2	0
6	<2.2	0	16	1600	3.204
7	1600	3.204	17	<2.2	0
8	4	0.602	18	<2.2	0
9	<2.2	0	19	<2.2	0
10	<2.2	0	20	<2.2	0

Method One (LOG Calculation):
Determine the LOG of each sample value (see table)
Consider all <2.2 values as being 1

Sum all of the LOG values — Sum of LOG Values = 13.637

Find the Average of the LOG Sum by dividing by the total number of samples (20) — 13.637 ÷ 20 Samples = 0.6819

The Geometric Mean is the Inverse LOG of that Average — Inverse LOG=10^{x}=$10^{0.6819}$ = **4.807 col/100 ml**

Method Two (Product of Values):

Multiply all of the MPN Values — Product of MPN Values = 4.349×10^{13}
Consider <2.2 values as being 1

Take the *n*th Root of the Product where *n* = number of samples

20th Root of the Product (= Product to the $^{1}/_{20}$ power) — $[4.349 \times 10^{13}]^{1/20}$ = $[4.349 \times 10^{13}]^{0.05}$ = **4.807 col/100 ml**

Based upon both methods the Geometric Mean is 4.807 coliform colonies per 100 ml. Therefore the well must be disinfected prior to use (chlorination required).

GROUNDWATER SOURCES UNDER THE DIRECT INFLUENCE
OF SURFACE WATER - DETERMINATION

PWSID NUMBER - _____
COUNTY - _____
SYSTEM - _____
SOURCE NAME - _____
EVALUATOR - _____ DATE - _____

CONCLUSION:

Based on the following information in Step 3, #2a, the source identified above:

_____ is under the direct influence of surface water.
_____ is not under the direct influence of surface water.

_____ _____
Evaluator Date

STEP ONE: SOURCE HISTORY

1. Has the Department previously determined that disinfection treatment is not required (*Waterworks Regulations*, 12 VAC 5-590-380 H)?

___ yes ____ no

Total Coliform Geometric Mean =_____

2. a. Has this source been directly associated with a biological waterborne disease outbreak?

___ yes ____ no

b. ... with a chemical contamination incident from the surface?

___ yes ____ no

3. For all sources consisting of a spring, infiltration gallery, Karstian well, or not classified by 1 and 2 above go on to Step Two.

If you answered yes to question 1 and do not meet the conditions of question 3, the source is not surface influenced. If no, enter geometric mean and go to Step Two.

If you answered yes to either 2a or 2b, the source is surface influenced.

STEP TWO: SOURCE PHYSIOGRAPHY AND GEOLOGY

Well Construction:

___ Class I ___ Class IIA ____ Class IIB ___ Other ___ Unknown

Well log on file? ____ yes ___ no

___ Structural defects, explain

Treatment Provided:

____ Disinfection - if checked, has the Division determined that disinfection without filtration is adequate treatment for this source?

____ yes ___ no

Total Coliform Geometric Mean = _____

___ Softening ___ Fe & Mn Removal ___ Other, explain _____

Geologic Province:

___ Coastal Plain ___ Piedmont ___ Blue Ridge ____ Valley & Ridge ___ Cumberland Plateau

Predominant Geological Characteristic:

____ Karstian ___ Non-Karstian

___ Demonstrated or known connections to surface via surface water bodies, sinkholes, troughs, drainage ways, or other geologic features, list documentation sources: _____
_____
_____

Turbidity Fluctuations:
___ yes ____ no

If yes, list documentation sources: _____
_____

1. The source <u>is not</u> surface influenced if it consists of a properly constructed Class I or Class II well in non-Karstian geology, with no history of turbidity fluctuations, and has been determined by the Division to be adequately treated by disinfection alone.

2. The source <u>is</u> surface influenced if structural defects or geologic conditions allow surface water to enter the source.

3. The determination for sources that consist of a spring, infiltration gallery, a well in Karstian geology, or otherwise not classified by 1 or 2 of this step shall proceed to Step Three.

STEP THREE: WATER QUALITY

Bacteriological Quality

Attach table of Total Coliform results (20 samples minimum collected over a six month period) showing dates and MPNs.

Total Coliform Geometric Mean = _____

% of samples > 100 organisms/100 ml = _____

Is there a record of confirmed Fecal Coliform contamination?

____ yes ___ no

If yes, attach a table of all Fecal Coliform results showing dates and MPNs.
Number of fecal positive results
Highest fecal result _____ organisms/100 ml

Physical and Chemical Quality

Is there a record of fluctuations in turbidity, temperature, pH or conductivity relative to conditions in nearby surface waters or weather conditions?

___ yes ____ no

If yes, attach a table of pertinent results, including the source(s) of such information.
Have these parameters been monitored? ___ yes ____ no

Particulate Analysis

Does the source exhibit the presence of diatoms, rotifers, coccidia, plant debris, insect parts, or Giardia cysts?

___ yes ___ no ____ no such analysis completed

1. The source is not surface influenced if the total coliform geometric mean of 20 samples collected over a six month period is less than 100 organisms/100 ml with no more than 10 percent of these samples exceeding 100 organisms/100 ml and has no record of confirmed fecal contamination.

Note: If the data needed to determine Step Three #1 is not available, the waterworks owner shall be instructed to develop this data via a special study.

2. The source is surface influenced if:

   a. the source is found to have confirmed fecal contamination

   b. the source physical and/or chemical characteristics fluctuate following climatic events or relative to conditions in nearby surface waters, or

   c. the source exhibits the presence of surface related particulates as identified by particulate analysis.

3. The source is not surface influenced if the total coliform geometric mean of 20 samples collected over a six month period is less than 100 organisms/100 ml and greater than 10 percent of these samples exceed 100 organisms/100 ml if:

    a. the source does not have confirmed fecal contamination, and

    b. the source physical and/or chemical characteristics do not fluctuate following climatic events or relative to conditions in nearby surface waters, or

    c. the source does not exhibit the presence of surface related particulates as identified by particulate analysis.

4. If 1 is not met and data to determine the various criteria in Step Three #2a, 2b, 2c or #3a, 3b, 3c is not available, a determination cannot be made based on existing data, and the waterworks owner shall be instructed to develop the needed data via a special study.

INTERIM MONITORING PROGRAM

Under Section 141.72 of the Federal Surface Water Treatment Rule (SWTR) and Section 12 VAC 5-590-420 B2f of the Virginia *Waterworks Regulations*, the following interim monitoring requirements must be followed by waterworks with unfiltered surface water sources or groundwater sources under direct influence of surface water that have been informed that they must install filtration treatment during the period before filtration is installed.

1. The owner must demonstrate that alternative sources of supply capable of meeting these requirements are not immediately available.

2. The owner must provide routine coliform sampling of the distribution system at a frequency of twice that required by Table 2.1 of the *Waterworks Regulations*.

3. The waterworks owner shall issue a continuing boil water notice through the public notification procedure until such time as the required filtration treatment technique is installed, and

4. The free available chlorine residual concentration in the distribution system shall be maintained at 2.0 mg/L or higher. The chlorine residual may not be less than 2.0 mg/L for more than 4 hours.

5. As an alternative to 3. and 4. above, the waterworks owner may demonstrate that the subject source can meet the appropriate C-T values shown in the Guidance Manual for compliance with the Filtration and Disinfection Requirements for Public Water Works Using Surface Water Sources, and be considered to satisfy the requirements for 99.9% and 99.99% removal of Giardia cysts and viruses respectively. In addition, the waterworks owner must comply with the following:

    a. Analysis of the source water performed quarterly for the contaminants listed in Tables 2.2, 2.3 and 2.4 of the *Waterworks Regulations*. The PMCLs shall not be exceeded.

    b. Daily turbidity monitoring at the entry point to the distribution system for the subject source and maintenance of the turbidity level not to exceed 5 TU.

    c. Coliform MPN analysis of the raw water based on sampling frequency shown in the chart below:

Population Served	MPN Samples/Week
<500	1
500 - 3,300	2
3,301 - 10,000	3
10,001 - 25,000	4

SUBJECT:
Water -

NOTICE OF SURFACE WATER INFLUENCE DETERMINATION

Name and Address

Dear

This notice is to inform you that under the requirements of the U.S. EPA Surface Water Treatment Rule and 12 VAC 5-590-430 of the Virginia *Waterworks Regulations* the following determinations have been made with respect to the direct surface water influence of your groundwater source(s).

is (not) under direct surface water influence
is (not) under direct surface water influence

(THIS CLOSING PARAGRAPH IS FOR THOSE NOT UNDER DIRECT INFLUENCE.)

Since your source(s) was (were) not found to be under direct surface water influence at this time, no further action on your part is required. Please retain this notice for your records. If you have any questions, please do not hesitate to contact me at_____.

(THIS CLOSING PARAGRAPH IS FOR THOSE THAT ARE UNDER DIRECT INFLUENCE.)

Since your source(s) has (have) been found to be under the direct influence of surface water, filtration and disinfection treatment techniques as discussed in 12 VAC 5-590-420 of the *Waterworks Regulations* must be installed within 18 months of this notice or by _____ . Additional options that you might wish to pursue would be permanent disconnection of the surface influenced source, development of new sources, or the connection to another waterworks.

During the interim period following this determination (effective upon receipt of this notice), but before resolution of this problem, the attached Interim Schedule shall be followed.

Please inform this office of your intentions with regard to this issue by _____ (60 DAYS FROM DATE OF LETTER). If you have any questions, please contact me at _____.

Sincerely,

_____

___/___
cc VDH-Richmond Central

EXAMPLE WELL SITE APPROVAL LETTER

(Date)

SUBJECT: _____(County)_____
Water - _____(1)_____

_____
_____
_____
_____

Dear _____ :

This letter is in reference to my _____(2)_____ evaluation of a proposed well site for approval as a public water supply source to serve _____(1)_____ located in _____ County. Present for the well site evaluation were _____
_____.

In accordance with 12 VAC 5-590-280 of the Commonwealth of Virginia *Waterworks Regulations*, this letter is to advise the proposed well site as approximately located on the attached _____(3)_____ is tentatively approved by this Department for construction of a Class ____(4)____ well. The well site is located _____(5)_____.

This approval is valid for a period of 12 months. If construction of the well has not commenced by _____(6)_____ , a re-evaluation of the well site will be required. The following items/documents must be submitted to this office for final approval of the well:

1. The well must be located at least 50 feet inside the boundaries of a surveyed, platted, and dedicated well lot. The well lot must be graded to divert surface runoff from the well and to prevent ponding on the well lot, and an all-weather access road, public or private, must be provided to the well lot. The well lot plat must be recorded in _____ County with the well lot dedication document. An example well lot dedication document is enclosed for your information. It is suggested that surveying and platting of the well lot(s) be delayed until testing verifies acceptable water quality and quantity.

2. The well must be constructed to meet Class _____(4)_____ requirements. Each well must be cased with approved casing to a depth of not less than ____(7)_____ feet and the bottom of the well casing must terminate in solid bedrock or other impervious formation. In addition the well must be grouted with neat cement grout to a depth of not less than _____(7)_____ feet. A signed copy of the well driller's water well completion report must be provided to this office indicating these minimum construction requirements.

3. During construction of the well, it is requested that this office be notified of the date and approximate time that grouting of the well will be accomplished. Please transmit this notification as soon as the information is available to you so that an Environmental Inspector or Engineer from this office can be present, if possible.

4. Upon completion of the well, a yield and drawdown test of a minimum duration of ___(8)___

hours is required to determine the reliable well production. A copy of the completed test results must be submitted.

5. Near the end of the yield test, water samples must be collected for chemical, radiological, and biological analyses. You are requested to notify this office for assistance in the proper collection of this sample.

6. A series of nine bacteriological samples must be collected from the discharge of the well and submitted to an approved laboratory to determine the bacteriological quality of the raw groundwater prior to the issuance of an operation permit. One bacteriological sample must be collected each hour during the last nine hours of the pumping test. These samples must be analyzed by the total coliform **Most Probable Number (MPN)** test method. Should any of the initial nine samples indicate contamination, an additional eleven samples for MPN analysis will be required. Additional bacteriological monitoring or other quality evaluations may be required depending upon the specific geology of the site and other factors. The need for additional water quality evaluations will be determined on a case by case basis.

7. Upon completion of the well and submittal of the samples, plans and specifications for development of the well head and installation of water system appurtenances must be submitted to this office for review in accordance with 12 VAC 5-590-280 of the *Regulations.* These plans and specifications must be prepared by a professional engineer licensed in Virginia. Included with the plans and specifications must be a completed permit application. The application form is attached (**Appendix O**).

Upon receipt of all required information and documents, and after approval of the plans and specifications has been given, a construction permit will be issued by the State Health Commissioner in accordance with 12 VAC 5-590-230 of the *Regulations*. Construction of the facilities shall not commence until receipt of the construction permit.

If I can be of further assistance, please do not hesitate to call me at (9).

Sincerely,

(10)

Enclosure
cc _____ County Administrator
____ County Building Official
___(11)___ Environmental Engineering Field Office

INSTRUCTIONS FOR WELL SITE APPROVAL LETTER

(1) Facility name, i.e., “Smith’s Restaurant”

(2) Date of well site inspection

(3) Title of USGS Topographic Map, tax map, or other appropriately scaled record drawing

(4) “I”, “IIA”, or “IIB” depending on local geology, topography, site conditions, and other factors. If needed, Contact DDW for assistance in establishing the class and type well to be required.

(5) Description of well site location, referencing nearby landmarks, highways, etc.

(6) Date one year from well site inspection date

(7) 100 feet or 50 feet for Class “I” or Class “IIB” well, respectively

(8) 48 hours unless source requirement, reduction of the 48hr may be granted to 24hr if the source is expected to have a low demand for use (i.e. 4 to 9 gpm). If $\leq$ 3 GPM, then 8 hours is required.

(9) Appropriate staff’s office phone number

(10) Appropriate staff signature

(11) Division of Drinking Water Field Office that covers subject county

WELL DEDICATION

_____, a Virginia Corporation, does dedicate that tract or parcel of real estate situated, lying and being in the _____ County, Virginia, more particularly described by deed and plat of survey of record in Deed Book ____, Pages ___, ___, ___, and ___, of the Clerk's Office of the Circuit Court of _____ County, Virginia, and being the identical real estate which said corporation acquired by grant with General Warranty of Title and Modern English covenants from _____. Said dedication being to establish the aforesaid area for water supply use only, and the said _____ _____ agrees that only appurtenances pertinent to the water supply system will be constructed in said area dedicated and that said lot (Number ____) will not be used for human habitation or other sources of contamination.

The full interest and control of the aforesaid area dedicated shall remain with the _____ and this instrument is solely for the purpose of assuring the Department of Health of the Commonwealth of Virginia as to the matters herein above set forth so long as said parcel is used for a water supply system; and this dedication shall be null and void and of no further effect should the well on the said premises be abandoned and the use thereof for a water supply system cease.

WITNESS the following signatures and seal this _____day of _____, 19__.

BY: _____

ATTEST: _____

I, _____, A Notary Public for the County aforesaid in the Commonwealth of Virginia do certify that _____, whose names are signed to the writing above, bearing date on the _____ day of _____, 19___, have acknowledged the same before me in my County aforesaid.

Given under my hand this _____ day of _____ , 19_____.

_____
Notary Public

My Commission Expires _____.

For use of Clerk of Court

This Well Dedication Document, as described above, was recorded in Deed Book _____, page _____ on the _____ day of _____, 19 _____.

SIGNED: _____ of the
_____ County Clerks Office

COMMONWEALTH of VIRGINIA
Department of Health
Division of Drinking Water
Comprehensive Business Plan
Transient Non-Community Waterworks (TNC)

System Management

System Name: _____ **County:** _____

New ☐ **Change of Owner** ☐ **Months Inactive** ☐ **LHD Transition** ☐

Owner _____ **Address** _____

Contact Person: _____ **Address** _____

Operator (If req) _____ **Address** _____

VA DPOR Operator License # (if applicable) _____ **Expires:** _____

Type of Facility: (Circle One) **Restaurant** **Campground** **Grocery** **Motel**

Other: _____ **Days/Months open/ year:** _____

Population: **Employees:** _____ **Customers:** _____

Total Served: _____

Will water be served to the public? (circle one) **YES / NO**

How will water be made available/served to the public: _____

Technical Criteria: **Water Supply:**

Number of sources: _____

Source Type: **Well** **Drilled** **Bored** **Unknown**

Pump Type: **Submersible** **Turbine** **Jet**

Storage: **Hydropneumatic** **Bladder Tank** **Other:** _____

Treatment Type (if any): _____

Well Lot: **(size)** _____ **Dedication Document:** **yes / no**

Known Contamination Sources within 50 ft of well? **yes / no**

If Yes, List them: _____

Underground Storage Tanks Present: **yes / no** **If Yes, Is it a Fuel Tank?** **yes / no**

Sewage Disposal: (Circle One) **Municipal** **Septic** **Package Plant**

OTHER: _____

Emergency Contact Numbers:

Are Emergency Procedures in place if something happens to the water system (I.e. well failure, line breaks, etc)? If so, please attach them. **yes / no**

COMMONWEALTH of VIRGINIA **Page 2 of 2**
Department of Health
Division of Drinking Water
Comprehensive Business Plan
Transient Non-Community Waterworks (TNC)

Technical Criteria: (cont)

Sampling:

1) **Routine Bacteriological Samples are to be collected and results submitted to DDW in accordance with the approved Bacteriological Sampling Site Plan**

# of samples due for monitoring period: (circle one) Quarterly / Monthly	# of Repeat samples due after detection of positive samples	4
# of samples due next monitoring period following coliform positive samples		5

2) **Nitrate Samples from each Point-of-Entry are to be collected and results submitted to DDW once annually**

3) **If treatment is provided then (Annually / Quarterly / Monthly) MPN-Raw water samples are to be collected and results submitted to DDW from each source.**

Operational Reports:

The following reports are due quarterly / monthly by the 10th of the following month: (circle all that apply)

Water Usage **pH** **Waivered due to Variance**
Chemical Usage **Chlorine Residuals**
Others as listed: _____

Financial:

This information is to demonstrate the owner's understanding and ability to maintain the financial needs of operating and maintaining a public waterworks. Items are to be identified on an annual schedule and are projections of future fund availability.

	Last Year	Current yr	1st	2nd	3rd	4th
a) Business Revenues						
b) Net Profits before waterworks costs						
c) Sampling Costs/ Lab Fees						
d) Operator Costs/ Fees (salary, licensing, etc)						
e) VA Waterworks Operation Fees (If Classified)						
f) Cost of Treatment - Chemicals						
g) Utility costs (e.g., electrical)						
h) All other waterworks related expenses						
I) Amount of savings (i.e; O&M, emergencies)						
j) Add (c) through (I)						
k) Subtract (j) from (b)						

By signing below, I hereby declare the information noted above is true and accurate to the best of my knowledge. If any information changes, I will notify VDH-DDW in writing within 7 business days. I further understand that this does not include improvements, or changes associated with the source, treatment, storage, and distribution of the water system. Such information is required to be submitted to DDW for approval and permit issuance prior to any construction.

Signature of Owner: _____ **Date:** _____

Owner request confidentiality (FOIA): YES / NO

Signature of DDW Rep: **Date:**

TRANSIENT NONCOMMUNITY WATERWORKS
Information Packet for Owners and Operators

Virginia Department of Health March 2002 March 2002
Division of Drinking Water

Introduction

The Virginia Department of Health began its public drinking water program 90 years ago with the goal of protecting public health. The federal government became involved when the United States Congress passed the Safe Drinking Water Act in 1974. Since that time the federal drinking water requirements have undergone numerous changes to address new drinking water challenges. The complexity of the requirements has increased significantly, and the number of regulated contaminants has increased from 25 to 100.

In order for the state, rather than the federal government, to have the ability to protect public health and to exercise day-to-day enforcement authority over public drinking water supplies, Virginia had to adopt its own regulations. State law and regulations define a public waterworks as a water system serving piped water for drinking or domestic use to at least 15 service connections or serves an average of at least 25 persons for at least 60 days each year.

The Virginia Department of Health Division of Drinking Water (DDW) has helped community and nontransient noncommunity waterworks to meet state and federal drinking water requirements for many years. Now the DDW is beginning a program to accept surveillance (or regulatory responsibility) of the transient noncommunity waterworks from the local health departments.

Purpose of this Information Packet

The purpose of this information packet is to provide a brief summary of the requirements that an owner or operator of a Transient Noncommunity (TNC) waterworks must satisfy. The Virginia Waterworks Regulations, a document of several hundred pages, contains all of the details of the requirements, and a copy of the full document is available to you. This short summary does not replace the regulations, but it does provide a starting point for you to better understand what is expected of you. The reason for all of the requirements is to protect the health of the consumers of the water. The primary requirements that pertain to TNC waterworks are:

- Acquiring operation and construction permits
- Sampling for coliform bacteria
- Sampling for nitrate and nitrite
- Implementing a cross connection control program
- Reporting certain information to the Division of Drinking Water on a regular basis
- Providing a licensed operator if certain drinking water treatment is utilized
- Providing public notification to consumers of your water if certain violations occur

Operation and Construction Permits

State law requires an owner to obtain a permit from the State Health Commissioner before constructing, modifying, or operating a public waterworks. The Health Commissioner uses a network of six DDW field offices staffed with engineers and inspectors, in convenient locations around the state, to perform the detailed work leading to the issuance of all permits. You will seldom, if ever, deal with anyone other than an engineer or inspector from the DDW field office near you. Included herein is a state map showing the DDW field office boundaries, addresses, and phone numbers.

Your first operation permit will be issued by the DDW. If your water system was previously approved or recognized by the local health department, and has been providing safe drinking water, the operation permit will be issued without any new requirements. However, we regularly provide suggestions that are designed to improve your source and operations.

If any new construction or modifications are planned, an application must be submitted to the field office in order to start the state's review and approval process. You will be informed of exactly what information may be required before you can proceed with the construction. All construction work must be designed by a licensed professional engineer and must meet design requirements listed in the Waterworks Regulations.

Coliform Bacteria

In most cases, a TNC waterworks serving under 1000 persons must collect one sample for coliform bacteria analysis per quarter. If there are significant water quality or source protection problems, the number of required samples will be increased. The presence of coliform bacteria in a water sample indicates that other, more harmful organisms may be present due to a breakdown in the sanitary protection of the waterworks. Bacteria can enter a waterworks through an improperly constructed well, a defect in the well's sanitary seal, a leaking or broken waterline, or an improperly protected storage tank. The DDW engineer or inspector will carefully review any sampling history and look closely at the source.

If you have never had to collect water samples previously, you will be given the proper training. Hundreds of waterworks owners and operators just like you have been successfully collecting these samples for many years.

The Waterworks Regulations require a bacteriological sample siting plan that spells out exactly how you are going to collect your coliform bacteria samples. The bacteriological monitoring instructions that you must follow is included herein. Also included herein is the actual sample siting plan, which identifies the location of sample sites. If you want to change the sampling plan, you will have to write to DDW asking for the change.

To analyze your samples, you may choose to use a private certified laboratory or the state lab (official name is Division of Consolidated Laboratory Services). Appropriate cost information and sampling containers will be provided by the lab you select.

Nitrate and Nitrite

Out of the nearly 100 chemical contaminants for which the federal government has established drinking water limits, only nitrate and nitrite apply to TNC waterworks. Nitrate and nitrite generally enter unprotected groundwater sources as result of runoff from fertilizer use, animal waste, or leaching from septic systems.

Nitrate and nitrite samples must be collected annually at a minimum, and more frequently if there is a problem. Sampling containers and cost information will be provided by the lab that you chose to use. Just as the case for coliform bacteria, private certified labs or the state lab are available for your use.

Cross Connection Control Program

Cross connections are physical connections to a water system which, under certain conditions, may result in the flow of water or other liquids, mixtures, or substances into the water system from any source other than the approved water supply source. Examples include:

- a garden hose with the outlet end submerged in a bucket of soapy water, a janitor's sink, a kid's wading pool, or a puddle of water on the driveway
- a kitchen sink sprayer with its spray head submerged
- a garden hose used in conjunction with an aspirating attachment to spray soap solution or lawn/garden chemicals
- an unapproved water source interconnected with an approved source.

The existence of a cross connection does not absolutely mean that contamination will occur; however, the potential for contamination exists and corrective action must be taken. Looking for cross connections on a regular basis and taking corrective action constitutes a cross connection control program.

Reports to the Division of Drinking Water
If your waterworks does not have treatment and is not required to meter, you will not have to send operational reports to the state. Otherwise, the state engineer or inspector will explain the type and frequency of reporting that may be required. The state engineer or inspector will also help you develop the appropriate report form.

Licensed Operator
DDW will advise you if a licensed waterworks operator is required to operate your water system. The most reasonable approach may be to find a licensed operator that offers his services for hire. The Department of Professional and Occupational Regulation deals with licensing of operators. They are located in Richmond.

Public Notification
Public notification is a procedure where the waterworks owner is required to notify the users of the water system of any violations or situations that may affect their health. Depending on the severity of the violation or situation, the notification process may have to be done within 24 hours, 30 days, or one year. You will be informed by the DDW field office of the notification process details at the time any such violation or situation occurs.

Technical Assistance
The engineers and inspectors in the DDW field offices are available to assist you in satisfying the requirements of the state and federal regulations and to help you provide better water to your customers. They do this by:

- conducting routine inspections and providing a detailed written report to you (routine inspections will be on a 12 to 24 month frequency);
- evaluating the results of your water sample analyses and advising you of any actions to take;
- investigating complaints related to your waterworks;
- providing training to you or your operator on an individual basis or through workshops with other waterworks owners and operators;
- standing ready to answer any questions you may have about any aspect of your water system.

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

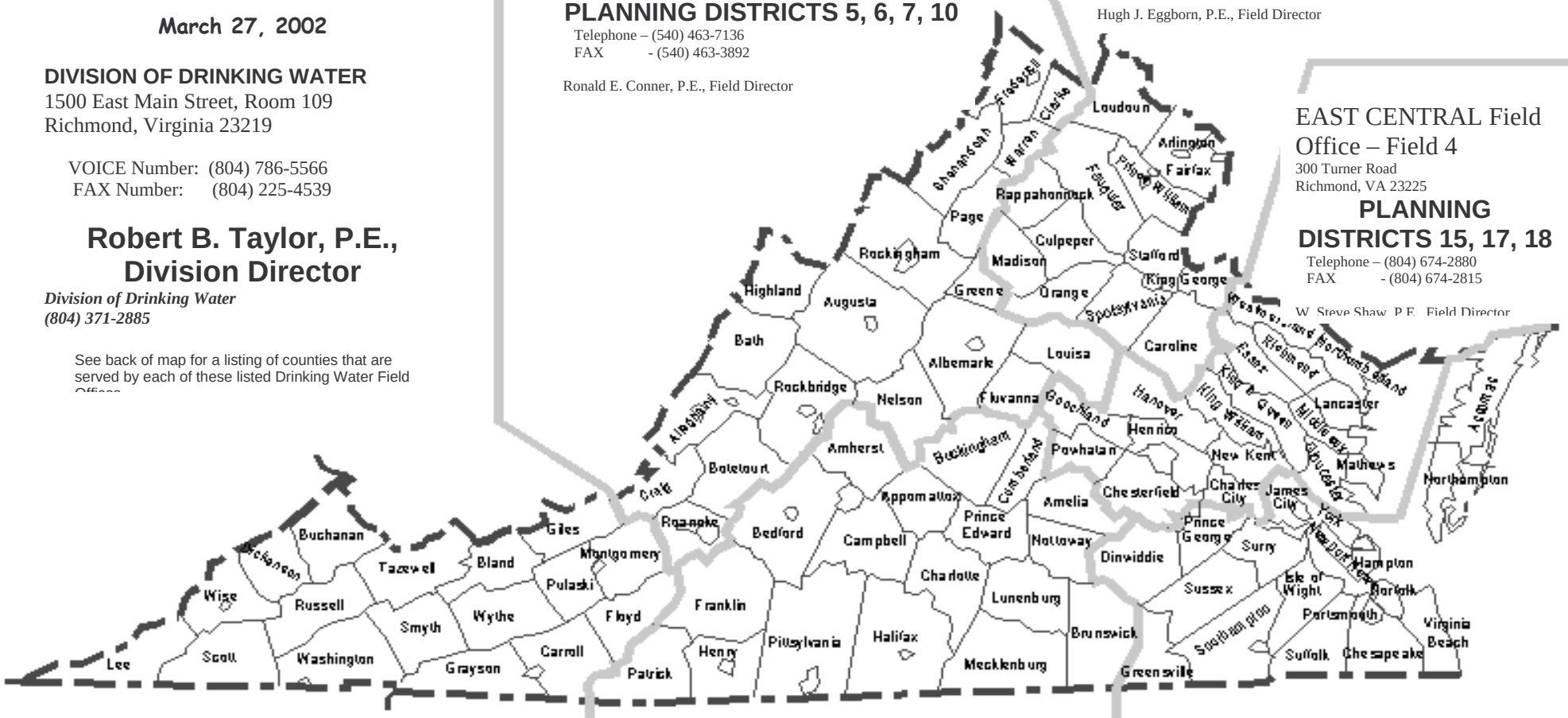
March 27, 2002

DIVISION OF DRINKING WATER
1500 East Main Street, Room 109
Richmond, Virginia 23219

VOICE Number: (804) 786-5566
FAX Number: (804) 225-4539

Robert B. Taylor, P.E.,
Division Director
Division of Drinking Water
(804) 371-2885

See back of map for a listing of counties that are served by each of these listed Drinking Water Field Offices.



LEXINGTON Field Office – Field 2

131 Walker Street
Lexington, VA 24450

PLANNING DISTRICTS 5, 6, 7, 10

Telephone – (540) 463-7136
FAX - (540) 463-3892

Ronald E. Conner, P.E., Field Director

CULPEPER Field Office – Field 6

400 South Main Street, 2nd Floor
Culpeper, VA 22701

PLANNING DISTRICTS 8, 9, 16

Telephone – (540) 829-7340
FAX - (540) 829-7337

Hugh J. Eggborn, P.E., Field Director

EAST CENTRAL Field Office – Field 4

300 Turner Road
Richmond, VA 23225

PLANNING DISTRICTS 15, 17, 18

Telephone – (804) 674-2880
FAX - (804) 674-2815

W. Steve Shaw, P.E., Field Director

ABINGDON Field Office – Field 1

454 East Main Street
Abingdon, VA 24210

PLANNING DISTRICTS 1, 2, 3, 4

Telephone – (276) 676-5650
FAX - (276) 676-5659

DANVILLE Field Office – Field 5

1347 Piney Forest Road
Danville, VA 24540

PLANNING DISTRICT

Telephone – (434) 836-8416
FAX - (434) 836-8424

John I. Capito, P.E., Field Director

SOUTHEAST VA Field Office – Field 3

5700 Thurston Avenue, Suite 203
Virginia Beach, VA 23455

PLANNING DISTRICTS 19, 20, 21, 22

Telephone – (757) 363-3876
FAX - (757) 363-3955

Information Packet to Owners and Operators

Abingdon Field Office

COUNTIES: Bland, Buchanan, Carroll, Dickenson, Floyd, Giles, Grayson, Lee, Montgomery, Pulaski, Russell, Scott, Smyth, Tazewell, Washington, Wise, Wythe
CITIES: Bristol, Galax, Norton, Radford

Culpeper Field Office

COUNTIES: Arlington, Caroline, Culpeper, Fairfax, Fauquier, King George, Loudoun, Madison, Orange, Prince William, Rappahannock, Spotsylvania, Stafford.
CITIES: Alexandria, Fairfax City, Falls Church, Fredericksburg, Manassas, Manassas Park.

Danville Field Office

COUNTIES: Amelia, Amherst, Appomattox, Bedford, Buckingham, Brunswick, Campbell, Charlotte, Cumberland, Franklin, Halifax, Henry, Lunenburg, Mecklenburg, Nottoway, Patrick, Pittsylvania, Prince Edward.
CITIES: Bedford-City, Danville, Lynchburg, Martinsville, South Boston.

Lexington Field Office

COUNTIES: Albemarle, Alleghany, Augusta, Bath, Botetourt, Clarke, Craig, Fluvanna, Frederick, Greene, Highland, Louisa, Nelson, Page, Roanoke, Rockbridge, Rockingham, Shenandoah, Warren.
CITIES: Buena Vista, Charlottesville, Clifton Forge, Covington, Harrisonburg, Lexington, Roanoke, Salem, Staunton, Waynesboro, and Winchester.

East Central Field Office

COUNTIES: Charles City, Chesterfield, Essex, Gloucester, Goochland, Hanover, Henrico, King and Queen, King William, Lancaster, Mathews, Middlesex, New Kent, Northumberland, Powhatan, Richmond, Westmoreland.
CITIES: Richmond.

Southeast Virginia Field Office

COUNTIES: Accomack, Dinwiddie, Greensville, Isle of Wight, James City, Northampton, Prince George, Southampton, Surry, Sussex, York
CITIES: Chesapeake, Colonial Heights, Emporia, Franklin City, Hampton, Hopewell, Newport News, Norfolk, Petersburg, Poquoson, Portsmouth, Suffolk, Virginia Beach, Williamsburg.

Information Packet to Owners and Operators

BACTERIOLOGICAL SAMPLE SITING PLAN INSTRUCTIONS
(Waterworks serving <1000 population)

I. Purpose - It is the purpose of this document to establish a Bacteriological Monitoring Program which will identify specific sampling location(s) which will provide coliform bacteria samples that are representative of quality of water distributed by this waterworks.

II. Responsible Charge - The owner or his designated representative will be responsible for collecting samples.

III. Program Elements

1. The waterworks is currently required to collect <u>one</u> water sample for coliform bacteria each calendar quarter.

2. The waterworks serves only one service connection. Therefore, all required routine and repeat samples shall be collected from the same service connection.

3. Routine Samples (Write Sample Type Code "D " on the Sample Form/Label)

    a. Routine samples shall be collected from approved water tap(s).

    b. Waterworks shall submit <u>one</u> routine sample for analysis each calendar quarter. Additional samples will be collected when directed by the Division of Drinking Water.

    c. When the required number of samples is more than one, the samples shall be taken at reasonably evenly spaced time intervals throughout the quarter.

    d. No routine samples shall be collected at the water source or at the entry point to the system.

4. Repeat Samples (Write Sample Type Code "R" on the Sample Form/Label)

    a. Following a positive routine sample, four repeat samples shall be taken within 24 hours of notification of a positive sample. These samples shall be collected from approved water taps.

    b. If only one water tap is available, the repeat samples shall be collected over a four-day period (one sample per day) or be collected all on the same day. If more than one approved tap is available, repeat samples may be collected from different taps.

Information Packet to Owners and Operators

5. Follow-Up Routine Samples

   If a routine sample is total coliform positive, five routine samples shall be collected in the next calendar quarter. These samples must be collected from approved tap(s) served by the waterworks and are to be evenly distributed throughout the quarter. If all five samples are negative, the waterworks may go back to the normal monitoring schedule of one sample per calendar quarter. If any samples are positive, the increased monitoring (five routine samples per quarter) must continue until all the samples are negative.

IV. Routine/Repeat Sample Sites

- All routine and repeat samples shall be collected from sites/taps as identified and approved by the Division of Drinking Water. The following taps should be avoided:

- Faucets with aerators or strainers, unless the aerators/strainers are removed
- Faucets with swivel-type connection (such as kitchen gooseneck faucet)
- Faucets with water filter or water purifier attached
- Leaky faucets that allow water to run along outside of faucet
- Faucets with vacuum breaker backflow preventer directly attached
- Hot water faucets
- Hoses (garden hose, slop sink hose)
- Fire hydrants or freeze-proof yard hydrants

{Include a sketch of the sample locations}

Information Packet to Owners and Operators

BACTERIOLOGICAL SAMPLE SITING PLAN

_____
(Name of Waterworks)

1. This waterworks is currently required to collect ____ water sample(s) for coliform analysis each calendar quarter. The sample location(s) identified below:

Routine and Repeat Sample Site	
Code	**Location**

2. When more than one routine sample per calendar quarter is required, the samples will be collected at evenly spaced time intervals throughout the quarter, beginning the first month of the sampling quarter. Allowances will be made for holidays, vacations, etc, to make sure that all of the required samples are analyzed each quarter.

3. When positive coliform bacteria result occurs, repeat samples are required within 24 hours of notification, and 5 routine samples are required in the next quarter. The repeat samples shall be collected from approved sample locations. If only one tap is available, the repeat samples shall be collected over a four-day period (one sample per day), or all four samples may be collected on the same day. If more than one approved tap is available, repeat samples shall be collected from the approved taps.

_____ _____
(Signature of Owner) (Date)

Information Packet to Owners and Operators

CROSS CONNECTION CONTROL PROGRAM

_____
(Name of Waterworks)

1. In order to minimize the possibility of a cross connection existing in our system, an initial inspection of all the facilities will be performed to locate and correct any cross connections identified.

2. Thereafter, routine inspections will be made annually to insure that no cross connections have developed. Areas of particular importance during the inspections are boiler make-up water lines, custodial and laboratory sinks, and all hose bibs.

3. Records of the initial and routine follow-up inspections and any actions taken due to the inspections will be maintained at _____for at least ten years.
(Location)
These records will be made available to the Division of Drinking Water upon request.

4. _____will be placed in responsible charge of the
(Name of Responsible Person)
administration of this cross connection control program.

_____ _____
(Signature of Owner) (Date)

VARIANCE TO METERING OF TOTAL WATER PRODUCTION
NONCOMMUNITY WATERWORKS

_____
(Name of Waterworks)

PERMIT NO. _____

This Variance to 12 VAC 5-590-520 of the Waterworks Regulations allows operation of this waterworks without metering of total water production, subject to the following conditions:

1. Total water production does not exceed 10,000 gallons per day (gpd).

2. This variance will be automatically revoked at such time that the total water production exceeds 10,000 gpd.

3. This variance is non-transferable and must be attached to the operating permit.

4. This variance will be revoked or suspended when the operation permit is revoked or suspended, or at the discretion of the State Health Commissioner.

Approved _____
Director, Division of Drinking Water
for the State Health Commissioner
pursuant to VA. Code § 2.2-604